SOIL SURVEY SONOMA PLANNING UNIT
Parts of Humboldt and Pershing Counties, Nevada

April 1975

INTERIM SOIL SURVEY REPORT
SONOMA PLANNING UNIT
Portions of Humboldt County, Southeast Part;
and Pershing County, East Part, Nevada

prepared by

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service

in cooperation with

UNIVERSITY OF NEVADA, RENO
Agricultural Experiment Station
and
UNITED STATES DEPARTMENT OF INTERIOR
Bureau of Land Management

FIELDWORK FOR THIS SURVEY WAS COMPLETED IN 1973. UNLESS OTHERWISE INDICATED, ALL STATEMENTS IN THIS REPORT REFER TO CONDITIONS IN THE AREA AT THE TIME THE SURVEY WAS IN PROGRESS.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of the Sonoma Planning Unit, Nevada contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, or other structure; in selecting soil for use as a construction material; and in appraising the value of tracts of land for agriculture, industry, or recreation.

Locating Soils

All the soils of the Sonoma Planning Unit are shown on the soils map at the back of this report. This map consists of several sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the soil map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the report. This guide lists all the soils of the survey area in alphabetic order by soil series name and map unit. It shows the page where each kind of soil is described and the page for the capability unit into which the soil has been classified.

Individual colored maps showing the relative suitability or limitations of soils for many specific purposes can be developed by using the soil map and information in the text. Interpretations not included in the text can be developed by grouping the soil according to their suitability or limitations for a particular use.

Farmers and ranchers and those who work with them can learn about the use and management of the soils in the soil descriptions and the capability groupings.

Engineers and builders will find under "Engineering Uses of the Soils," tables that describe soil properties that affect engineering and construction and show the relative suitability of the soils for specified engineering or construction uses.

Those interested in the use of soils for wildlife habitat and recreational purposes will find information in sections on these uses. Tables that show the relative suitability or limitations of the soils for these uses are included.

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INTERIM SOIL SURVEY OF THE SONOMA PLANNING UNIT, NEVADA PORTIONS OF HUMBOLDT COUNTY, SOUTHEAST PART AND PERSHING COUNTY, EAST PART

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE IN COOPERATION WITH THE UNITED STATES DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT AND THE UNIVERSITY OF NEVADA, RENO, AGRICULTURAL EXPERIMENT STATION.

INTRODUCTION

The area covered by this soil survey consists of approximately 407 square miles or 260,480 acres in Humboldt and Pershing Counties, Nevada (fig. 1). Approximately 211 square miles or 135,040 acres are in the southeastern part of Humboldt County. This area lies along the Humboldt River from Golconda on the east to the Pershing County line on the west. It extends south into Grass Valley and onto the west slope of the Sonoma Mountain Range to the Pershing County line. Approximately 196 square miles or 125,440 acres are in the northeastern part of Pershing County. This area lies in Grass Valley and on the west slope of the Sonoma Range, immediately south of the Humboldt-Pershing County boundary. Winnemucca, the county seat of Humboldt County, is located in the northern end of the survey area.

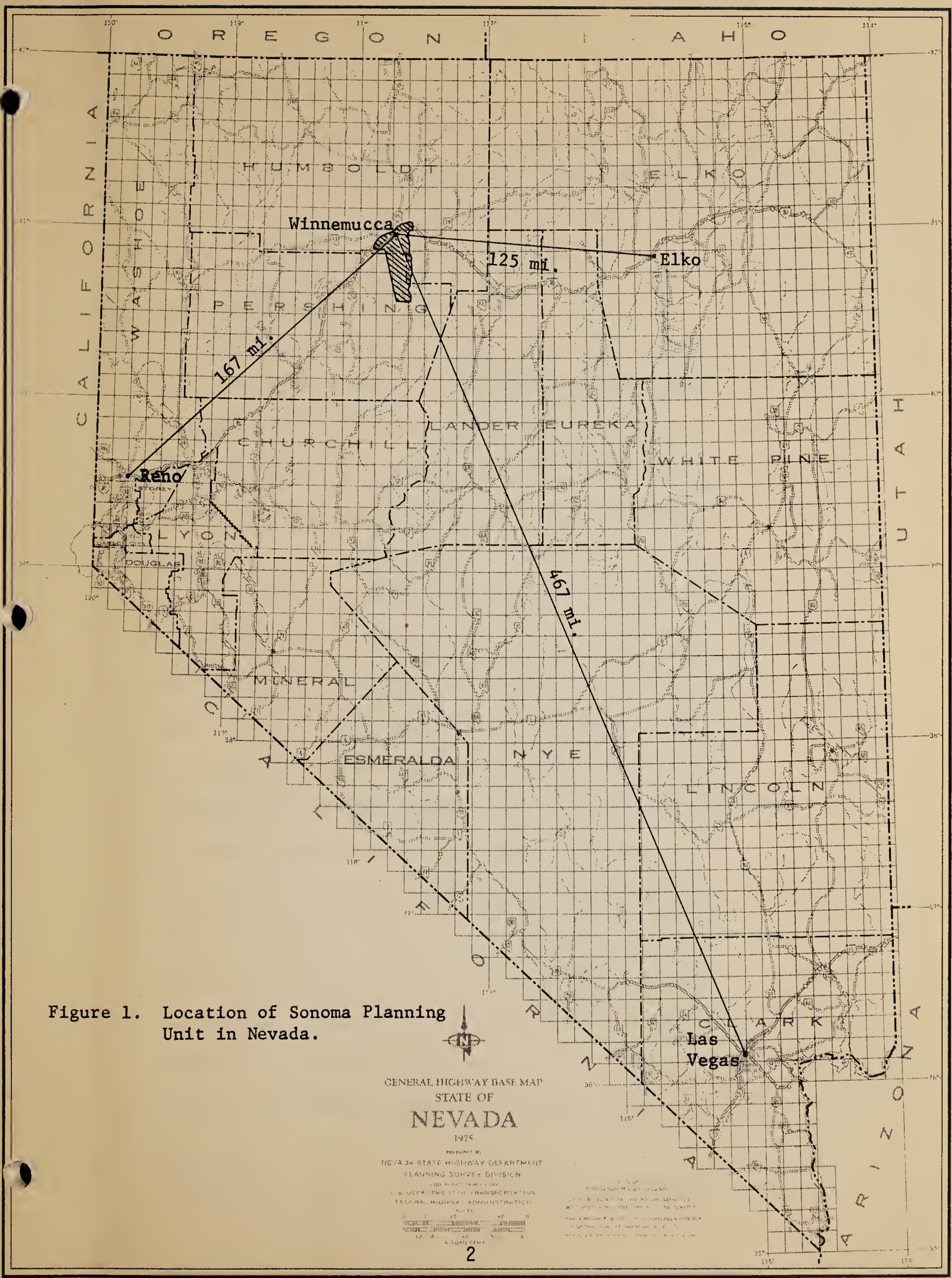

Figure 1. Location of Sonoma Planning Unit in Nevada.

GENERAL NATURE OF THE AREA

This section gives information concerning this soil survey. It discusses physiography and geology, climate, vegetation and land use.

Physiography and Geology

This survey area lies within the Great Basin section of the Basin and Range province. It covers the flood plains and adjacent terraces along the Humboldt River from Golconda on the east to the Pershing County line on the west; part of Grass Valley, a tributary drainage to the Humboldt River; and the west slope of the Sonoma Range.

The area is drained by the Humboldt River which flows in a general east-west direction near the north boundary. The streams flow mainly west from the crest toward Grass Valley or the Humboldt River. Clear Creek, however, trends south in the interior of the range before turning abruptly west toward Grass Valley. Grass Valley, a north-south trending valley, drains into the Humboldt River at Rose Creek near the western boundary of the area.

The entrenched valley of the Humboldt River consists of a flood plain and adjacent terraces. Logs of wells (4)[1/] located in the Area and seismic work (2) indicate there are several hundred feet of alluvium, primarily sand and gravel underlying the surface mantle of soil in the valley of the Humboldt River. The floor of Grass Valley consists of a narrow flood plain which is bordered by terraces and

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1/ Numbers in parenthesis refer to Literature Cited, p. 346.

and alluvial fans. The alluvial fans comprise more than two-thirds of Grass Valley basin in the southern end of the Area. A wide area at the mouth of Grass Valley and bordering the valley of the Humboldt River consists of a nearly level lake plain of late Pleistocene Lake Lahontan which has been only slightly modified by stream and eolian activity. A thin upper zone of silty to sandy lake beds over lake clays has been reworked with shallow deflation depressions and areas of low stabilized sand dunes. The Sonoma Range parallels the east side of Grass Valley. Along much of its western border a frontal fault is clearly expressed by a topographic break in the slope and linearity of the range front. The western slope has been dissected to a mature topography. The principal streams have eroded far back from the range front.

Rising gradually from (and in part grading to) the relict lake plain surface are piedmont slopes flanking the Sonoma Range. At the toes of these fan surfaces, thin veneers of alluvium have been and are being deposited on the relict lake plain surface. These slopes rise and join the front of the Sonoma Range increasing in thickness of alluvium with increasing altitude. The alluvial deposits are finer textured near the valley floor, becoming coarser toward the perimeter of the valley. In the north end of Grass Valley and on the terraces adjacent to the Humboldt River are deposits of wind-blown sand in dunes ranging from a few inches to many feet thick. Volcanic ash which occurs locally in beds as much as a foot thick, but is more generally mixed with the surface alluvium, is an important component of the surface deposits.

The Sonoma Range is dominantly composed of Paleozoic sedimentary and metamorphic rocks; mainly quartzite, argillite, sandstone, shale, and slate. Mesozoic rocks consisting of shale, sandstone, and some limestone and dolomite, crop out in large fensters in the western part of the range. Mesozoic granitic intrusive rocks crop out in the southern part of the range. In addition, poorly to moderately consolidated Tertiary clastic rocks have been incorporated into the range block in isolated places along the western front.[2/]

[2/] Except where otherwise noted, data for this section was obtained from Quaternary Geology of the Winnemucca Area, Nevada. See Literature Cited (3).

Climate

The climate in the survey area is semiarid with annual precipitation ranging from a low of 3.13 inches (1954) to a high of 18.38 inches (1884). The mean annual precipitation for the period of 1931 to 1960 measured at the Winnemucca airport was 8.63 inches. Sixty-six percent of the annual precipitation falls as rain or snow between December and May.

Average annual precipitation at Golconda has been reported as 6.0 inches, in Clear Creek Canyon (elevation 5,200 feet) 10.2 inches, at Sheep Ranch (elevation 5,300 feet) 10.2 inches, and Sonoma Mountain (elevation 8,400 feet) 20.9 inches (4).

The dry summers are characterized by hot days and cool nights. Temperatures tend to rise sharply right after sunrise and remain compartively high during the daylight hours, then drop rapidly after sundown. Daily temperature variations of 50° F. are not uncommon. Temperature extremes for the period of record (1931 to 1960) have ranged from a high of 106° F. (August 1940) to a low of -36° F. (January 1937). Readings of 100° F. or higher occur on an average of two days each year. Readings of 32° F. or lower occur on an average of 195 days, and 0° F. or lower, eight days each year. The frost-free season based on a minimum temperature of 32° F. and 14 years record (1956 to 1970 excluding 1960 when it was 62 days) is 104 days.

Temperatures are estimated to be a few degrees lower at the south end of Grass Valley where elevations are 4,800 to 5,000 feet, and several degrees lower in the Sonoma Range where elevations range from about 5,000 to 9,400 feet.[3/]

[3/] Except where otherwise noted, data for this section was obtained from Climatological Data and Climatological Summary, U. S. Department of Commerce. See Literature Cited (6).

Vegetation

Big sagebrush *(Artemisia tridentata)* is the dominant shrub in the vegetative cover on the Sonoma Range and the alluvial fans and terraces bordering the range along its north face and in the northern end of Grass Valley. On the floor of Grass Valley and on the alluvial fans and terraces in the southern end of the valley, shadcale *(Atriplex confertifolia)* and bud sagebrush *(Artemisia spinescens)* are the dominant shrubs.

Associated with big sagebrush on the mountain slopes are other shrubs such as: serviceberry *(Amelanchier spp.)*, snowberry *(Symphoricarpos spp.)*, rabbitbrush *(Chrysothamnus spp.)*, peachbrush *(Prunus andersonii)*, and elderberry *(Sambucus glauca)*. Utah juniper *(Juniperus osteosperma)* is also common on many of the slopes. Grass understory on these higher elevation sites consists dominantly of cheatgrass *(Bromus tectorum)*, Sandberg bluegrass *(Poa secunda)*, bottlebrush squirreltail *(Sitanion hystrix)*, Idaho fescue *(Festuca idahoensis)*, Thurber needlegrass *(Stipa thurberiana)*, bluebunch wheatgrass *(Agropyron spicatum)*, and basin wildrye *(Elymus cinereus)*, chokecherry *(Prunus virginiana)*, and aspen *(Populus tremuloides)* are common trees along streams in bottoms of the canyons.

Arrowleaf balsamroot *(Balsamorhiza sagittata)*, buckwheat *(Eriogonum spp.)*, lupine *(Lupinus spp.)*, tapertip hawksbeard *(Crepis acuminata)*, and phlox *(Phlox spp.)* are the dominant forbs in the mountains.

Associated with big sagebrush on the alluvial fans and terraces are spiny hopsage *(Grayi spinosa)* and littleleaf horsebrush *(Tetradymia*

glabrata). The grass understory consists primarily of cheatgrass, bottlebrush squirreltail, and Sandberg bluegrass. Annual mustards *(Brassica spp.)*, clasping pepperweed *(Lepidium perfoliatum)*, Russian-thistle *(Salsola kali)*, milkvetch *(Astragalus spp.)* are common forbs in these areas.

Associated with shadscale and bud sagebrush where these shrubs are dominant are cheatgrass, bottlebrush squirreltail, Sandberg bluegrass, annual mustards, clasping pepperweed, and Russianthistle.

Black greasewood *(Sarcobatus vermiculatus)* is the principal shrub on the saline bottomlands in Grass Valley and along the Humboldt River. Rubber rabbitbrush *(Chrysothamnus nauseosus)* is also common, either mixed with greasewood or in separate communities. Saltgrass *(Distichlis stricta)*, alkali sacaton *(Sporobolus airoides)*, and basin wildrye are grasses associated with these shrubs. Basin wildrye also commonly grows in stands alone on the flood plains.

Extensive acreages of native grass meadow occupy the flood plains of Humboldt River and Grass Valley. Creeping wildrye *(Elymus triticoides)* is the dominant grass in the nonsaline meadows. Saltgrass is dominant in the saline-alkali areas. Willows *(Salix spp.)*, and wild rose *(Rosa spp.)* border the streams and sloughs.

In sand dune areas, common along Humboldt River and at the mouth of Grass Valley, the vegetation consists principally of hairy horsebrush *(Tetradymia comosa)*, fourwing saltbush *(Atriplex canescens)*, and big sagebrush. Associated with these shrubs are Indian ricegrass *(Oryzopsis hymenoides)*, and canaigre *(Rumex hymenosepalus)*, (5).

Land Use

Approximately fifty percent of the land in the Area is in private ownership. The remaining fifty percent is federal land administered by the Bureau of Land Management. Sections of federal and private land are intermingled in a checkerboard pattern throughout most of the survey area.

The federally owned land, and much of the privately owned land is used primarily for grazing of domestic livestock. Habitat for deer, upland game birds, and other kinds of wildlife including wild horses is an important use. Recreational use is, at the present time, an important phase of the Bureau of Land Management program. A number of picnic sites have been developed in Water Canyon. Mining, on a limited scale, is another important land use.

A number of farms and ranches have been developed on the Humboldt River flood plain, and in Grass Valley. The ranches are primarily devoted to beef cattle production. Native grass hay for cattle feed is grown in natural meadows which are irrigated from Humboldt River and other streams. The farms, mostly irrigated by water pumped from deep wells, produce alfalfa hay and seed, and small grains.

In the northern part of the survey area, particularly near the city of Winnemucca, urban expansion is being experienced.

HOW THIS SURVEY WAS MADE

Soil scientists made this survey to learn what kinds of soil are in the Sonoma Planning Unit, where they are located, and how they can be used. The soil scientists went into the Area knowing they likely would find mnay soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in areas nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series and the soil phase are the categories of soil classification most used in the survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Adelaide and Dun Glen, for example, are the names of two soil series. All

the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Adelaide silt loam, 2 to 8 percent slopes, is one of several phases within the Adelaide series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show roads, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown

separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Goldrun-Preble complex is an example.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Dryn-Winada association is an example.

There are places in the survey area where the soil material is so rocky that it has not been classified by soil series. These places are components of soil associations and complexes and are described in the survey. They are called land types and are given descriptive names. Rock outcrop in the map unit Mullyon-Rock outcrop complex is an example of a land type.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

In this soil survey two intensities of mapping, a high intensity and a low intensity, are used. Those units mapped at low intensity are more broadly defined than the high intensity units.

DESCRIPTIONS OF THE SOILS

This section describes the soil series and mapping units of the Sonoma Planning Unit. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

A general description of each soil series is given, followed by a brief description of each mapping unit in that series. For full information on any mapping unit it is necessary to read the description of the soil series as well as that of the mapping unit.

An important part of each series description is the representative profile which is described in detail, horizon by horizon. All mapping units in a series have a profile like the representative profile, except for minor differences pointed out in the mapping unit descriptions.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the soil map at the back of this report. The soil map shows the location and distribution of each mapping unit. An asterisk preceding the mapping unit name, both in the descriptions and in table 1, indicates units that have been mapped at low intensity and thus are more broadly defined than the other units.

At the end of each mapping unit description the land capability units, range site, and wildlife suitability group into which the soil has been classified, is listed.

Table 1. Approximate acreage and proportionate extent of mapping units in Sonoma Planning Unit, Nevada

Soil name	Acres	Percent
Adelaide silt loam, 2 to 8 percent slopes	9,780	3.76
Adelaide silt loam, low rainfall, 0 to 2 percent slopes	2,286	.88
Adelaide silt loam, low rainfall, 2 to 8 percent slopes	5,744	2.21
Adelaide silt loam, slightly saline-alkali, 0 to percent slopes	3,860	1.49
Adelaide stony silt loam, 4 to 15 percent slopes	1,335	.51
Benin loamy fine sand, 0 to 2 percent slopes	459	.18
Benin silt loam, 0 to 2 percent slopes	4,934	1.90
Benin silt loam, saline-alkali, 0 to 2 percent slopes	41	.02
Benin silt loam, 15 to 30 percent slopes	275	.11
*Blackhawk silt loam, 0 to 4 percent slopes	9,018	3.47
Bliss fine sandy loam, 2 to 8 percent slopes	8,922	3.43
*Bliss-Chiara association	6,149	2.37
Chiara stony very fine sandy loam, 2 to 4 percent slopes	246	.09
*Dryn-Winada association	7,106	2.73
Duffer silty clay loam, slightly saline-alkali	505	.19
Duffer silty clay loam, strongly saline-alkali	1,554	.60
Dun Glen loam, 0 to 2 percent slopes	6,466	2.49
Dun Glen loam, 2 to 4 percent slopes	742	.29
Dun Glen loam, gravel substratum, 0 to 2 percent slopes	255	.10
Golconda silt loam, 2 to 8 percent slopes	3,592	1.38
Golconda silt loam, 8 to 15 percent slopes	1,498	.58
Goldrun fine sand, 4 to 15 percent slopes	1,380	.53
Goldrun loamy fine sand, 0 to 2 percent slopes	2,340	.90
Goldrun loamy fine sand, undulating	743	.29
Goldrun-Benin complex, undulating	1,540	.59
Goldrun-Benin complex, rolling	8,152	3.14
Goldrun-Preble complex	883	.34
*Golsum-Graley association	19,587	7.54
*Graley-Percoun association	5,422	2.08
*Granyon-Shoken association	1,496	.58
*Harcany-Winevada association	7,504	2.89
Humboldt silty clay loam, sand substratum	585	.23
Humboldt silty clay loam, slightly saline	9,575	3.69
Humboldt silty clay loam, strongly saline	881	.33
Humboldt silty clay, slightly saline	978	.38
McConnel fine sandy loam, 0 to 2 percent slopes	758	.29
McConnel gravelly fine sandy loam, 4 to 8 percent slopes	1,978	.76

Table 1. Approximate acreage and proportionate extent of mapping units in Sonoma Planning Unit, Nevada

Soil name	Acres	Percent
McConnel cobbly sandy loam, 15 to 30 percent slopes	85	.03
*Mullyon-Rock outcrop complex	3,295	1.27
Needle Peak silt loam, slightly saline-alkali	3,572	1.37
Needle Peak silt loam, strongly saline-alkali	669	.26
*Nevtah stony silt loam, 15 to 30 percent slopes	400	.15
Ninch fine sand, 0 to 15 percent slopes	991	.38
*Nomara-Gosumi association	6,788	2.61
Orovada loam, 0 to 2 percent slopes	1,382	.53
Orovada gravelly loam, 0 to 2 percent slopes	644	.25
Orovada gravelly loam, 2 to 4 percent slopes	452	.17
*Percoun-Rock outcrop association	5,255	2.02
*Pernty-Iver association, steep	7,981	3.07
*Pernty-Iver association, very steep	14,180	5.46
Pocker silty clay loam	1,289	.50
Preble silt loam, slightly saline-alkali	300	.12
Preble silt loam, strongly saline-alkali	1,978	.76
Prida silt loam, slightly saline-alkali	715	.28
Prida silt loam, strongly saline-alkali	6,756	2.60
Pumper loam	1,973	.76
Rad loamy fine sand, 4 to 8 percent slopes	1,713	.66
Rad fine sandy loam, 0 to 2 percent slopes	1,406	.54
Rad fine sandy loam, 2 to 4 percent slopes	980	.38
Raglan silt loam, slightly saline-alkali	6,700	2.58
Raglan silt loam, strongly saline-alkali	3,526	1.36
Rebel loam, 0 to 2 percent slopes	1,979	.76
Rebel loam, 2 to 4 percent slopes	614	.24
Rose Creek loam	656	.25
Sagouspe loamy fine sand	243	.09
Shabliss very fine sandy loam, 2 to 8 percent slopes	1,715	.66
*Shabliss very fine sandy loam, 8 to 15 percent slopes	2,096	.81
*Sonocan-Shepan association	12,093	4.66
Sonoma silt loam, slightly saline-alkali	1,223	.47
Sonoma silt loam, strongly saline-alkali	3,738	1.44
*Spinlin-Panin association, sloping	943	.36
*Spinlin-Panin association, moderately steep	2,035	.78
*Sumine-Pernty association	3,206	1.23
*Trunk-Pocan association	10,876	4.19
Valmy fine sandy loam	4,445	1.71
Valmy fine sandy loam, saline-alkali	437	.17
Valmy fine sandy loam, undulating	234	.09
Weso loamy sand	165	.06

Table 1. Approximate acreage and proportionate extent of mapping units in Sonoma Planning Unit, Nevada

Soil name	Acres	Percent
Weso very fine sandy loam	685	.26
Weso very fine sandy loam, gravel substratum, 2 to 4 percent slopes	844	.32
TOTAL	259,826	100.00

Adelaide Series

The Adelaide series consists of well drained soils. They are two-storied soils; the upper part of which is developed in loess containing a high percent of volcanic glass, and the lower part, a buried soil, is developed in gravelly, loamy alluvium from mixed sources including volcanic ash, quartzite, sandstone, shale, slate, chert, andesite, rhyolite, limestone, and dolomite. They are located on smooth to gently convex alluvial fans and terraces with slopes of 0 to 8 percent. The vegetation consists mostly of big sagebrush, Sandberg bluegrass, squirreltail grass, cheatgrass, pepperweed and other annual forbs. These soils occur at elevations of 4,000 to 5,000 feet where the mean annual temperature ranges from 47° to 50° F., the mean annual precipitation is about 6 to 10 inches, and the frost-free season is about 100 to 120 days.

Typical Adelaide soil profiles have a sequence of four main parts: (1) a surface layer of light brownish gray silt loam about 11 inches thick; (2) light gray silica-cemented hardpan about 3 inches thick; (3) a buried horizon of pale brown clay loam about 9 inches thick; and (4) very pale brown or light gray, gravelly or very gravelly loam, sandy loam or loamy sand which is silica-cemented.

The Adelaide soils are very slowly permeable due to the hardpans. The effective depth is less than 20 inches unless ripped in which case it can be increased to 20 to 30 inches. Available water capacity is low. Runoff is medium, and the erosion hazard is slight to moderate depending on slope.

A representative profile of Adelaide silt loam is about 11 miles south of Winnemucca in Pershing County, Nevada approximately 700 feet north and 300 feet west of the southeast corner of section 19, T. 34 N., R. 38 E.

A1--0 to 60 inches, light grayish brown (10YR 6/2) slightly micaceous silt loam, dark grayish brown (10YR 4/2) moist; weak fine platy structure; slightly hard, friable, nonsticky, nonplastic; many very fine and fine roots; many very fine, and few fine vesicular pores; noncalcareous; neutral (pH 5.8); abrupt smooth boundary. 1 to 5 inches thick.

B2--2 to 8 inches, very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive, slightly hard, friable, nonsticky, nonplastic; many very fine and fine roots; many very fine, and few fine tubular pores; mildly alkaline (pH 7.8); clear smooth boundary. 4 to 7 inches thick.

C1si--8 to 11 inches, light gray (10YR 7/2) weakly silica-cemented loam (about 10 percent gravel), dark grayish brown (10YR 4/2) moist; weak thick platy structure; very hard, firm, nonsticky, slightly plastic; few very fine and fine roots in the pan, but common in fractures; many very fine and fine tubular pores; common thin pale brown (10YR 6/3) silica films in bands and pores, and as bridges between sand grains; strongly alkaline (pH 8.6); clear wavy boundary. 2 to 4 inches thick.

C2sim--11 to 14 inches, light gray (10YR 7/2) and pale brown (10YR 6/3) strongly cemented duripan, with many medium and fine prominent white (10YR 8/1) lime veins and coatings, grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) moist; moderate fine angular and subangular blocky structure; extremely hard, firm and very firm, nonsticky, nonplastic; common very fine and few fine exped roots; common very fine, and many micro interstitial pores; many thin silica films coat ped faces and pores, and occur as laminae; effervescent in matrix; strongly alkaline (pH 9.0); clear smooth boundary. 2 to 5 inches thick.

B2tb--14 to 23 inches, pale brown (10YR 6/3) clay loam, with many fine distinct white (10YR 8/2) lime coatings and filaments, brown (10YR 5/3 moist; moderate fine angular blocky structure; hard, friable, sticky, plastic; few very fine roots; few very fine tubular, and many micro interstitial pores; many fine clay films on ped faces and in pores; strongly effervescent; strongly alkaline (pH 9.0); clear wavy boundary. 5 to 10 inches thick.

C1sib--23 to 30 inches, very pale brown (10YR 7/3) gravelly loam (20 percent gravel) with common fine distinct white (10YR 8/2) lime veins, brown (10YR 4/3) moist; massive in place but breaks with ease to weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few very fine roots; few very fine tubular and common very fine interstitial pores; contains about 20 percent hard, firm durinodes; strongly effervescent; strongly alkaline (pH 8.8); clear wavy boundary. 5 to 10 inches thick.

C2sicamb--30 to 40 inches, light gray (10YR 7/2) very gravelly loamy sand that is indurated in the upper 1/8 to 1/4 inch and weakly cemented below; brown (10YR 5/3) moist; massive; extremely hard, extremely firm upper part, and slightly hard, friable in lower part; no plant roots; common very fine interstitial pores; many very fine white (10YR 8/2) lime coatings on indurated material and on discontinuous silica laminae in lower part, also completely coating gravel in upper part and gravel bottoms in lower part; common very fine interstitial pores; violently effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 7 to 14 inches thick.

C3b--40 to 53 inches, very pale brown (10YR 7/3) very gravelly loamy sand (80 to 90 percent gravel), brown (10YR 5/3) moist; single grained; loose when dry and moist; no plant roots; many fine interstitial pores; some gravel are coated with white (10YR 8/2) lime on undersides; strongly effervescent; moderately alkaline (pH 8.4).

Solum thickness and depth to the cemented hardpan ranges from 10 to 15 inches. Depth to the buried hardpan ranges from 26 to 41 inches. The upper soil above the hardpan is noneffervescent. The hardpan and buried soil are effervescent. Peds and rock fragments in the buried soil are heavily lime coated. Texture of the buried B2t horizons range from clay loam to clay.

Adelaide silt loam, 2 to 8 percent slopes (11).--This soil occurs as fan-shaped areas on alluvial fans and terraces with slopes ranging from 2 to 8 percent. It has a profile similar to that which is representative for the series except the duripan is at 10 inches depth. Included in delineated areas are about 15 percent of other soils including Blackhawk, Golconda and Weso soils.

This soil is not well suited for irrigated cropland. It is used mainly for range for livestock and wildlife habitat. The native vegetation is principally big sagebrush, Sandberg bluegrass, squirreltail, and cheatgrass. However, if irrigation water is provided shallow rooted crops can be grown.

Land capability unit IVe-21, irrigated; VIIs-231, dryland.

Range site Droughty loam NV-24-20; 8 to 10 inch precipitation zone.

Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Adelaide silt loam, low rainfall, 0 to 2 percent slopes (12).--This soil occurs as elongated areas on nearly level alluvial fans and terraces. It has a profile similar to that representative for the series except the buried B2t horizons are clay in texture. Included in delineated areas are about 10 to 15 percent of other soils including Blackhawk, Golconda, and Weso soils.

This soil is not well suited for irrigated cropland. It is used primarily as range for livestock and as wildlife habitat. The native vegetation is principally shadscale, budsage, cheatgrass, squirreltail, pepperweed, and mustards. However, if irrigation water is provided shallow rooted crops can be grown.

Land capability unit IVs-40, irrigated; VIIs-231, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group, 3-4-I, irrigated; --43, dryland.

Adelaide silt loam, low rainfall, 2 to 8 percent slopes (13).--The soil occurs as fan-shaped areas on alluvial fans and terraces with slopes of 2 to 8 percent. The profile is similar to that described as representative for the series except the buried B2t horizons are clay in texture. Included in delineated areas are about 10 to 15 percent of other soils including Blackhawk, Golconda and Weso soils.

This soil is not well suited for irrigated cropland. It is used mainly as rangeland for livestock and wildlife habitat. The native vegetation is principally shadscale, budsage, cheatgrass, squirreltail, pepperweed, and mustards. However, if irrigation water is provided and carefully controlled to prevent erosion, shallow rooted crops can be grown.

Land capability unit IVe-21, irrigated; VIIs-231, dryland.

Range site, Desert loamy NV-24-2.

Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Adelaide silt loam, slightly saline-alkali, 0 to 2 percent slopes (14).--This soil occurs as elliptically shaped areas on nearly level alluvial fans and terraces. It has the profile described as representative for the series. It is slightly saline-alkali affected. Included in delineated areas are about 15 to 20 percent of other soils including Blackhawk, Golconda and Weso soils.

This soil is not well suited for irrigated cropland. It is used primarily as range for livestock and wildlife habitat. The native vegetation is mainly big sagebrush, Sandberg bluegrass, cheatgrass, and squirreltail. However, if irrigation water is provided shallow rooted crops can be grown.

Land capability unit IVs-40, irrigated; VIIs-231, dryland.

Range site, Droughty loam NV-24-20; 8 to 10 inche precipitation zone.

Wildlife suitability group, 3-4-I, irrigated; --43, dryland.

Adelaide stony silt loam, 4 to 15 percent slopes (15).--This soil occurs as fan-shaped areas on alluvial fans and terraces with slopes ranging from 4 to 15 percent. The profile is similar to that described as representative for the series except the cemented hardpan is at 12 inches, and about .1 to 1 percent of the surface is covered with stones. Included in delineated areas are about 15 to 20 percent of other soils including other units of Adelaide soils, and Blackhawk, Golconda and Weso soils.

This soil is not suited for irrigated cropland. It is used mainly for livestock range and wildlife habitat. The principal native vegetation is big sagebrush, Sandberg bluegrass, cheatgrass, and squirreltail.

Land capability unit VIIs-237, dryland.

Range site, Droughty loam (NV-24-20); 8 to 10 inch precipitation zone.

Wildlife suitability group, --43, dryland.

Benin Series

The Benin series consists of well drained soils formed in thin alluvium and loess high in volcanic ash over moderately fine and fine textured lacustrine sediments. Slopes are 0 to 30 percent. They are on terraces at elevations of 4,000 to 5,000 feet. Native vegetation is principally shadscale, bud sagebrush, greasewood, and squirreltail. The climate is semi-arid with a mean annual precipitation of 6 to 9 inches, mean annual temperature of 45° to 50° F., and the frost-free season is 100 to 120 days.

Typical Benin profiles have three main parts: (1) light gray strongly alkaline silt loam about 8 inches thick; (2) very pale brown silty clay about 15 inches thick; and (3) light gray silty clay extending to 70 inches or more.

Benin soils are very slowly permeable. Effective depth is 20 to 40 inches (based on observed root distribution). Available water capacity is high. Runoff is very slow to rapid with water ponding slightly in some areas after heavy rains. The erosion hazard is slight to high.

A representative profile of Benin silt loam is located in an area of Humboldt County, Nevada about 8 miles southwest of Winnemucca, immediately northwest of the Winnemucca airport, approximately 1/4 mile south of the northwest corner of section 15, T. 35 N., R. 37 E.

A1--0 to 3 inches, light gray (2.5Y 7/2) silt loam, grayish brown (2.5Y 5/2) moist; weak medium and thin platy structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots;

many very fine and fine vesicular pores; much of the surface is covered by dark brown lichens and most of it cracks polygonally; slightly effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary. 0 to 4 inches thick.

C1--3 to 8 inches, very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky, plastic; many very fine and few fine roots; many very fine and fine tubular, and common very fine vesicular pores; few thin silica films in pores; common silica bridges and thin coatings on sand grains; slightly effervescent; strongly alkaline (pH 8.6); clear smooth boundary. 3 to 11 inches thick.

IIC2ca--8 to 23 inches, very pale brown (10YR 8/3) light silty clay, pale brown (10YR 6/3) moist; strong medium angular blocky structure; extremely hard, extremely firm, sticky, plastic; common very fine and fine exped roots; many very fine and fine exped pores; between peds filled with loose soil material; common ostracod shells; 70 percent of the faces of peds are coated with white (2.5Y 8/2) lime, and 15 percent coated with black (10YR 2/2) manganese oxide stains; slightly effervescent matrix and violently effervescent on lime coats; very strongly alkaline (pH 9.2); clear wavy boundary. 10 to 19 inches thick.

IIC3--23 to 33 inches, light gray (2.5Y 7/3) silty clay, grayish brown (2.5Y 5/2) moist; weak medium prismatic that parts to strong medium and fine angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; many very fine and fine exped roots; many very fine and fine exped pores; many ostracod shells; 75 percent of ped faces have a thin coating of manganese and 15 percent have white lime flecks; strongly effervescent; strongly alkaline (pH 8.7); clear wavy boundary. 8 to 12 inches thick.

IIC4--33 to 54 inches, light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; strong coarse prismatic structure; extremely hard, extremely firm, very sticky, very plastic; few exped roots; common very fine and fine exped pores; many ostracod shells; 95 percent of faces of peds coated with thin continuous very dark gray (N 3/) manganese stains; strongly effervescent; moderately alkaline (pH 8.4); clear wavy boundary. 20 to 24 inches thick.

Depth to the unconformable lacustrine materials is typically 4 to 10 inches, but may be as deep as 15 inches in some profiles. These soils are usually dry but are moist in the winter and spring months. The A1 and C1 horizons are slightly or noneffervescent and moderately or strongly alkaline. Textures of the surface horizons are usually silt loam but are loamy fine sand in a few areas. Textures of the unconformable lacustrine underlying materials are silty clay or clay. These horizons have electrical conductivity of 4 to 20 mmhos and 15 to 40 percent exchangeable sodium to depths of 25 to 36 inches.

Benin loamy fine sand, 0 to 2 percent slopes (16).--This soil occurs as irregularly shaped areas on nearly level terraces. Slopes are 0 to 2 percent. It has a profile similar to that described as representative for the series except the surface 8 inches is loamy fine sand. Included in delineated areas areas are about 15 to 20 percent Goldrun, and other Benin soils.

This soil is used mainly as range for livestock and wildlife habitat. It is not well suited for irrigated cropland. However, if irrigation water is provided and carefully controlled in consideration of the very slow permeability, many crops can be grown. This soil is subject to severe wind erosion if the surface is left bare.

Land capability unit IVs-48, irrigated; VIIs-229, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group 2-4-I, irrigated; --43, dryland.

Benin silt loam, 0 to 2 percent slopes (17).--This soil occurs as irregularly shaped areas on nearly level terraces. It has the profile described as representative for the series. Included in delineated areas are about 15 percent Benin silt loam, saline-alkali; Benin loamy fine sand, and Goldrun, Prida, and Raglan soils.

This soil is used primarily for range for livestock and wildlife habitat. It is not well suited for irrigated cropland. However, if irrigation water is provided and carefully controlled in consideration of the very slow permeability, many crops can be grown. The native vegetation is primarily shadscale, bud sagebrush, and squirreltail. The erosion hazard is slight.

Land capability unit IVs-41, irrigated; VIIs-226, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group 2-4-I, irrigated; --43, dryland.

Benin silt loam, 15 to 30 percent slopes (18).--This soil occurs as long, narrow escarpments along the edges of terraces. Slopes range from 15 to 30 percent. It is essentially the same as that described for the series except the A1 horizon is usally absent and the C1 horizon is about 3 inches thick. Included in delineated areas are about 5 to 10 percent other units of Benin, and Goldrun soils.

This soil is used principally for range for livestock and wildlife habitat. It is not suited for irrigated cropland be-

cause of slope. The native vegetation is primarily shadscale, bud sagebrush, and squirreltail. Runoff is rapid, and the erosion hazard is high.

Land capability unit VIIe-224, dryland.

Range site Desert sodic terrace NV-24-3.

Wildlife suitability group --44, dryland.

Benin silt loam, saline-alkali, 0 to 2 percent slopes (19).--This soil occurs as small, irregularly shaped areas on nearly level terraces. The profile is similar to that described as representative for the series except it is moderately to strongly saline-alkali affected. Included in delineated areas are about 15 percent, Prida, Raglan, and nonsaline-alkali Benin soils.

This soil is presently used principally for range for livestock and wildlife habitat. It is not well suited for irrigated cropland due to salinity and alkali. The native vegetation is principally greasewood, shadscale, and basin wildrye.

Land capability unit VIIs-221, dryland.

Range site Desert sodic terrace NV-24-3.

Wildlife suitability group --44, dryland.

Blackhawk Series

The Blackhawk series consists of shallow, well drained soils. They formed in alluvium from a mixture of rocks which include quartzite, slate, conglomerate, chlorite schist, tuffs, and tuff breccia with a mantle of loess containing volcanic ash. Slopes are 2 to 8 percent. They are on gently to moderately sloping alluvial fans at elevations of 4,000 to 5,500 feet. Native vegetation is shadscale, bud sagebrush, cheatgrass, pepperweed, and other annuals. The climate is semi-arid with a mean annual precipitation of 6 to 8 inches, a mean annual temperature of 45° to 50° F., and frost-free season of about 100 to 110 days.

Typical Blackhawk profiles have three main parts: (1) light brownish gray silt loam about 14 inches thick; (2) a strongly silica-cemented hardpan about 16 inches thick; and (3) very pale brown to brown, stratified coarse sand and gravelly coarse sand that extends to 60 inches.

Blackhawk soils have restricted permeability due to the hardpan. Effective depth is 12 to 20 inches. Available water capacity is low to moderately low. Runoff is medium, and the erosion hazard is moderate.

A representative profile of Blackhawk silt loam is in an area of Pershing County, Nevada about 21 miles south of Winnemucca, approximately 600 feet east and 1,300 feet south of the north quarter corner of section 3, T. 32 N., R. 38 E.

A1--0 to 3 inches, light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure; slightly hard, friable,

slightly sticky, slightly plastic; few roots; many fine and medium vesicular pores; surface has polygonal cracks, 1 to 1 1/2 inches deep, and 3 to 6 inches across; strongly alkaline (pH 8.6); abrupt smooth boundary. 2 to 3 inches thick).

B2--3 to 14 inches, light gray (10YR 7/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium and fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common fine roots; many very fine and fine interstitial pores; moderately alkaline (pH 8.3); abrupt smooth boundary. 8 to 15 inches thick.

C1sim--14 to 16 inches, light brownish gray (10YR 6/2) strongly silica-cemented hardpan, dark grayish brown (10YR 4/2) moist; strong thin platy structure; very hard, very firm; few fine roots; many very fine interstitial pores; common thin silica films coating pores, bridging sand grains, and as discontinuous laminae; very strongly alkaline (pH 8.8); abrupt smooth boundary. 2 to 5 inches thick.

C2sica--16 to 21 inches, pale brown (10YR 6/3) loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure that parts to weak fine angular blocky aggregates; slightly hard, friable, nonsticky, nonplastic; common very fine roots; many very fine tubular pores; 30 percent very hard, firm, brittle durinodes that contain common thin silica films in pores and bridges between sand grains; matrix is noneffervescent, strongly effervescent on few fine lime filaments and coatings on durinodes; strongly alkaline (pH 9.0); abrupt smooth boundary. 4 to 8 inches thick.

C3sicam--21 to 30 inches, pale brown (10YR 6/3) strongly silica-cemented duripan, dark grayish brown (10YR 4/2) moist; weak and moderate thick platy structure; extremely hard, extremely firm; few very fine and fine roots only in seams and between plates; few fine interstitial pores; many fine silica films in pores and bridging sand grains, and common moderately thick discontinuous silica laminae; white (10YR 8/2) lime coatings on most silica films, mainly on laminae; violently effervescent; very strongly alkaline (pH 9.2); abrupt wavy boundary. 8 to 10 inches thick.

IIC4sica--30 to 48 inches, very pale brown (10YR 7/3) coarse sand, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; few fine and many very fine interstitial pores; 30 percent hard, firm, brittle durinodes; violently effervescent; strongly alkaline (pH 9.0); abrupt wavy boundary. 15 to 20 inches thick.

IIC5--48 to 60 inches, brown (10YR 5/3) gravelly coarse sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; many very fine and fine interstitial pores; strongly alkaline (pH 8.6).

Solum thickness and depth to the hardpan ranges from 12 to 20 inches. The soils are usually dry from late spring to late fall. The mean annual soil temperature is 49° to 54° F. Reaction of the solum is mildly to strongly alkaline and noneffervescent. The B horizon is dominantly silt loam but is loam or very fine sandy loam in some profiles. The hardpan is one thick layer in some profiles but more commonly consists of 2 or more strongly cemented layers interbedded with weakly silica-cemented material or strata with friable matrix containing durinodes. The upper part of the hardpan is noneffervescent to strongly effervescent and increases to strongly or violently effervescent with depth.

Blackhawk silt loam, 0 to 4 percent slopes (20).--This soil occurs as large areas on alluvial fans and terraces with slopes ranging from 0 to 4 percent. The soil has the profile described as representative for the series. Included in delineated areas are about 15 percent Adelaide, Dun Glen, and Golconda soils, and other Blackhawk soils with slopes of 4 to 8 percent.

This soil is used mainly as range for livestock. It is not well suited for irrigated cropland. However, if irrigation water is provided shallow rooted crops will thrive. The native vegetation is primarily shadscale, bud sagebrush, cheatgrass, pepperweed, and other annuals.

Land capability unit IVe-21, irrigated; VIIs-231, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group 3-4-I, irrigated; --44, dryland.

Bliss Series

The Bliss series consists of moderately deep, well drained soils formed in alluvium from a wide mixture of rocks including sandstone, shale, slate, argillite, quartzite, rhyolite, dacite, basalt, andesite, and tuff with a loess mantle containing volcanic ash. Slopes range from 1 to 30 percent. They are on nearly level to moderately steep alluvial fans and terraces at elevations of 4,000 to 5,500 feet. Native vegetation is primarily big sagebrush, spiny hopsage, squirreltail, Sandberg bluegrass, cheatgrass, and mustards. The climate is semi-arid with a mean annual precipitation of 8 to 10 inches, mean annual temperature is 45° to 50° F., and the frost-free season is 100 to 120 days.

Typical Bliss profiles have three main parts: (1) light brownish gray or pale brown fine sandy loam or very fine sandy loam about 22 inches thick; (2) pale brown, calcareous, very fine sandy loam about 6 inches thick; and (3) strongly silica-cemented hardpan extending to 45 inches.

The Bliss soils are moderately permeable to the hardpan. Effective depth is 20 to 36 inches. Available water capacity is moderately low to high. Runoff is slow to rapid, depending upon slope. The erosion hazard is slight to high.

A representative profile of Bliss fine sandy loam is in an area of Humboldt County, Nevada about 4 miles northeast of Winnemucca, approximately 800 feet west and 600 feet south of the northeast corner of section 14, T. 36 N., R. 38 E.

A1--0 to 4 inches, light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure; soft, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; mildly alkaline (pH 7.5); abrupt wavy boundary. 2 to 6 inches thick.

B21--4 to 13 inches, pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many very fine and few fine roots; many very fine interstitial pores; mildly alkaline (pH 7.5); clear wavy boundary. 6 to 10 inches thick.

B22--13 to 22 inches, pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky, nonplastic; common very fine, few fine and medium roots; many very fine interstitial pores; mostly effervescent but slightly effervescent in occasional spots; moderately alkaline (pH 8.4); clear wavy boundary. 8 to 12 inches thick.

C1ca--22 to 28 inches, pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky, nonplastic; common very fine, few fine and medium roots; many very fine interstitial pores; slightly effervescent; strongly alkaline (pH 9.0); abrupt wavy boundary. 4 to 8 inches thick.

C2sicam--28 to 45 inches, very pale brown (10YR 7/3) strongly cemented duripan; brown (10YR 5/3) moist; moderate thick platy structure; very hard, very firm; common fine faint white (10YR 8/2) lime mottles; roots matted between plates; strongly effervescent; strongly alkaline (pH 9.0).

Depth to the strongly cemented hardpan is 20 to 36 inches. These soils are dry more than half the time the soil temperature is warmer than 47° F. The solum is neutral or mildly alkaline and non-effervescent except in spots where some effervescence may occur. In these spots reaction ranges to moderately alkaline. The control section from 10 inches to the hardpan averages very fine sandy loam

or silt loam, but includes strata of loam or fine sandy loam in some profiles. The Cca horizons are slightly to violently effervescent and strongly or very strongly alkaline. The hardpan is underlain by gravel in some profiles.

Bliss fine sandy loam, 2 to 8 percent slopes (21).--This soil occurs as large areas on alluvial fans and terraces with slopes ranging from 2 to 8 percent. This soil has the profile described as representative for the series. Included in delineated areas are about 15 percent Chiara, Rad, and Shabliss soils, and other Bliss soils with slopes that are less than 2 percent and some that are greater than 8 percent.

This soil has slow to medium runoff, and the erosion hazard is slight to moderate.

This soil is used principally for livestock range and wildlife habitat. It is moderately well suited for irrigation if irrigation water is provided, and crops adapted to the area are seeded.

Land capability unit IIIe-21, irrigated; VIc-220, dryland.

Range site Droughty loam NV-24-20; 8 to 10 inch precipitation zone.

Wildlife suitability group 2-4-I, irrigated; --43, dryland.

Bliss-Chiara association (22).--This association occurs as long, narrow areas on side slopes of washes dissecting alluvial fans and terraces. It consists of about 45 percent Bliss fine sandy loam, 8 to 15 percent slopes, and about 40 percent Chiara fine sandy loam, 15 to 30 percent slopes. The Bliss soils have a profile similar to that described as representative for the series except slopes are 8 to 15 percent. They are on north-facing side slopes of deep drainage channels. The Chiara soils have a profile that is similar to that described as representative for the series except it is nonstony and are on slopes of 15 to 30 percent. They are on the south-facing slopes of the channels and ridges of dissected alluvial fans. Included are about 15 percent Rad fine sandy loam, Shabliss very fine sandy loam, and other Bliss soils with less than 8 percent slopes, and other Chiara soils with slopes less than 15 percent.

The native vegetation on Bliss soils consists of big sagebrush, horsebrush, rabbitbrush, stipa, and cheatgrass; and on Chiara soils it is big sagebrush, horsebrush, squirreltail, and cheatgrass. The Bliss soils are moderately permeable to the hardpan. Chiara soils are moderately permeable above the hardpan. Effective rooting depth is 16 to 24 inches for Bliss soils, and 10 to 20 inches for Chiara soils. Available water capacity is 4 to 6 inches for Bliss soils, and 2.5 to 3.5 inches for Chiara soils. The runoff is rapid on Bliss soils, and very rapid on Chiara soils. These soils have a high erosion hazard.

These soils are used principally for rangeland and wildlife habitat. They are not well suited for irrigated farming because of the dissected topography and limited availability of water for irrigation.

Bliss component: Land capability unit VIc-220, dryland.

Range site Droughty loam NV-24-20; 8 to 10 inch precipitation zone.

Wildlife suitability group --43, dryland.

Chiara component: Land capability unit VIIe-221, dryland.

Range site Loamy NV-24-5; 8 to 10 inch precipitation zone.

Wildlife suitability group --43, dryland.

Chiara Series

The Chiara series consists of shallow, well drained soils formed in a thin loess mantle (less than 18 inches thick) high in volcanic ash which is superimposed over silty, calcareous alluvium mainly from tuffs, tuff breccias, basalt, andesite, quartzite, and rhyolite. They are on alluvial fans with slopes ranging from 2 to 30 percent. The native vegetation is mainly big sagebrush, horsebrush, rabbitbrush, Sandberg bluegrass, squirreltail, cheatgrass, and annual forbs. Elevations are 4,000 to 5,500 feet. The climate is semi-arid with a mean annual precipitation of 8 to 10 inches; mean annual temperature is 45° to 50° F.; and the frost-free season is 100 to 110 days.

Typical Chiara soil profiles have two main parts: (1) light brownish gray or light gray very fine sandy loam, calcareous in the lower part, about 17 inches thick; and (2) silica-cemented, indurated hardpan.

Chiara soils are moderately permeable to the hardpan. Effective depth is 10 to 21 inches. Available water capacity is low. Runoff is slow to rapid, depending on slope. The erosion hazard is slight to high.

A representative profile of Chiara very fine sandy loam is in an area of Humboldt County, Nevada about 1,650 feet south and 2,500 feet west of the northeast corner of section 16, T. 35 N., R. 38 E.

A1--0 to 3 inches, grayish brown (10YR 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak, medium platy structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine and medium roots; many very fine and fine interstitial pores; .1 to 1 percent stones; neutral (pH 6.8); clear smooth boundary. 3 to 6 inches thick.

B2--3 to 10 inches, pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; many very fine, fine and medium roots; many very fine and fine interstitial and tubular pores; 5 percent gravel; neutral (pH 7.0); clear wavy boundary. 4 to 7 inches thick.

C1ca--10 to 17 inches, very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine interstitial and tubular pores; 5 percent gravel; slightly effervescent in upper part, increasing in lower part; strongly alkaline (pH 8.6); abrupt wavy boundary. 3 to 8 inches thick.

C2sim--17 to 24 inches, pale brown indurated hardpan, violently effervescent; strongly alkaline (pH 8.6).

These soils are usually dry or dry more than half the time the soil temperature is about 47° F. Depth to the hardpan is dominantly 12 to 15 inches but ranges to as shallow as 10 inches or as deep as 20 inches. Textures throughout the profile are very fine sandy loam or silt loam. The solum is noncalcareous and the reaction ranges from neutral to mildly alkaline. Depth to lime ranges from 7 to 13 inches. The C1ca horizon in some profiles has up to 60 percent silica-cemented concretions. Reaction ranges from moderately alkaline to strongly alkaline. Stones and cobbles on or in the surface range from none to 3 percent. The B2 and C1 horizons are normally free of stones.

Chiara stony very fine sandy loam, 2 to 4 percent slopes (23).--This soil occurs as long, narrow strips on ridge tops of deeply dissected alluvial fans and terraces. It has the profile described as representative for the series. Included in delineated areas are about 15 percent Bliss, Rad, and Shabliss soils.

The native vegetation is primarily big sagebrush, rabbitbrush, Sandberg bluegrass, squirreltail, and cheatgrass. The soil is moderately permeable to the hardpan. Effective rooting depth is 10 to 20 inches. Runoff is slow to medium, and the erosion hazard is slight to moderate.

This soil is used primarily for rangeland and wildlife habitat. It is not well suited for irrigation due to the deeply dissected landscape and the narrow, small areas of the soil. Land capability unit IVs-53, irrigated; VIIs-231, dryland. Range site Loamy NV-24-5; 8 to 10 inch precipitation zone. Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Dryn Series

The Dryn series consists of well drained soils. They formed in residuum and colluvium weathered from chert, argillite, andesite, slate, and quartzite. Slopes are 30 to 70 percent. Vegetation is big sagebrush, rabbitbrush, squirreltail, bluebunch wheatgrass, Sandberg bluegrass, Nevada bluegrass, cheatgrass, lupine, balsamroot, hawksbeard and milkvetch. They occur at elevations of 6,500 to 8,000 feet where the mean annual precipitation is 12 to 15 inches; mean annual air temperature is 35° to 40° F.; and the frost-free season is 50 to 80 days.

Typical Dryn soil profiles have three main parts: (1) a surface layer of grayish brown very stony and gravelly loam about 16 inches thick; (2) brown or yellowish brown very gravelly and cobbly clay about 32 inches thick; and (3) quartzite bedrock.

The Dryn soils are slowly permeable. Effective depth is 40 to 60 inches. Available water capacity is low to moderately low. Runoff is rapid, and the erosion hazard is high.

Representative profile of Dryn very stony loam is in an area of Humboldt County, Nevada about 6 miles southeast of Winnemucca at a site 1,300 feet south, and 1,000 feet west of the southeast corner of section 18, T. 35 N., R. 39 E.

A11--0 to 3 inches, grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak very fine platy structure; soft, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 40 percent gravel; neutral (pH 6.6); clear wavy boundary. 2 to 5 inches thick.

A12--3 to 11 inches, grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial and few very fine tubular pores; 40 percent gravel; neutral (pH 6.8); clear wavy boundary. 7 to 10 inches thick.

B1--11 to 16 inches, brown (10YR 5/3) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; weak, fine subangular blocky structure; hard, friable, sticky, plastic; common very fine and few fine and medium roots; many very fine interstitial and few very fine tubular pores; few thin clay films on ped faces and in pores; 50 percent gravel, 10 percent cobbles; neutral (pH 6.8); clear wavy boundary. 4 to 6 inches thick.

B21t--16 to 25 inches, yellowish brown (10YR 5/4) very gravelly clay, dark yellowish brown (10YR 3/2) moist weak very fine subangular blocky structure; very hard, friable, very sticky, very plastic; few very fine, fine and medium roots; few very fine tubular pores; few thin clay films on ped faces and in pores; 40 percent gravel, 20 percent cobbles; neutral (pH 6.8); clear wavy boundary. 8 to 10 inches thick.

B22t--25 to 48 inches, brown (10YR 5/3) very gravelly clay, very dark yellowish brown (10YR 3/4) moist; massive; very hard, friable, very sticky, very plastic; few very fine roots; few very fine interstitial and tubular pores; few thin clay films coating and bridging sand grains, gravel, and rock fragments; 40 percent gravel, 40 percent cobbles and stones; neutral (pH 6.6).

R--48 to 50 inches, quartzite bedrock.

The surface is covered with about 15 percent gravel, 5 percent cobbles, and 2 percent stones, boulders and rock outcrop. Thickness of the solum is 40 to 60 inches. The dark colored A1 horizons are 12 to 16 inches thick. The B2t horizons are dominantly very gravelly clay but range to include strata of very gravelly clay loam. The clay content averages 45 to 55 percent, and coarse fragments average 50 to 80 percent.

Dryn-Winada association (24).--This association occurs on steep and very steep convex mountain slopes. It consists of about 45 percent Dryn very stony loam, 30 to 50 percent slopes; about 30 percent Winada very stony loam, 50 to 70 percent slopes; and 10 percent Rock outcrop. These soils have the profiles described as representative for their respective series. The Dryn soils are on steep to very steep, convex mountain slopes. They lack bedrock within 20 inches. The Winada soils are on very steep mountain slopes. They have sandstone bedrock within 20 inches. The Rock outcrop occurs in small, scattered areas along the ridge tops. Included are about 15 percent Dryn very stony loam, 50 to 70 percent slopes, Percoun extremely stony silt loam, and other cryoborolls.

The native plant cover on Dryn soils is big sagebrush, rabbitbrush, squirreltail, cheatgrass, and lupine; on Winada soils it is low sagebrush, low rabbitbrush, gilia, and lupine. The Rock outcrop is barren. The Dryn soils have slow permeability, and for Winada it is moderately slow. Available water capacity is low to moderately low for Dryn soils, and low for Winada soils. Dryn soils have rapid runoff, and Winada soils have very rapid runoff. These soils have a high erosion hazard.

Dryn and Winada soils are used principally for rangeland and wildlife habitat. They are not suited for irrigation farming.

Dryn component: Land capability unit VIIs-214

Range site Upland loamy NV-24-21; 12 to 16 inches precipitation zone.

Wildlife suitability group --42, dryland.

Winada component: Land capability unit VIIs-218, dryland

Range site Upland ridges NV-24-16

Wildlife suitability group --42, dryland.

Rock outcrop component: VIIIs, dryland

Duffer Series

The Duffer series consists of deep, poorly drained, calcareous, silty soils. They formed in alluvium, loess and lake sediments from a variety of rocks including gneiss, schist, granodiorite, slate, limestone, dolomite, quartzite, rhyolite, and volcanic ash. Slopes are 0 to 2 percent. They are on nearly level lake plains and terraces at elevations of 4,000 to 4,500 feet. Native vegetation is principally black greasewood, rabbitbrush, buffaloberry, basin wildrye, saltgrass, ar lkali sacaton. The climate is semi-arid with a mean annual precipitation of 7 to 10 inches; mean annual temperature of 45° to 50° F.; and the frost-free season is 100 to 110 days.

Typical Duffer profiles have three main parts: (1) light gray, calcareous, silty clay loam about 18 inches thick; (2) a white, marly, iron mottled silty clay loam about 23 inches thick; and (3) gray, micaceous, iron mottled, very fine sandy loam that extends to 60 inches.

Duffer soils have slow permeability. Effective rooting depth is over 60 inches. Available water capacity is moderately high to high depending on degree of salinity. Runoff is very slow, and the erosion hazard is slight. A high water table fluctuates between 1 and 5 feet depending upon the season of the year.

A representative profile of Duffer silty clay loam is in an area of Pershing County, Nevada about 12 miles south of Winnemucca, approximately 700 feet north and 700 feet east of the southwest corner of section 25, T. 43 N., R. 36 E.

A1--0 to 3 inches, grayish brown (10YR 5/2) silty clay loam, dark brown (10YR 3/3) moist; weak thin platy parting to weak fine subangular blocky structure; hard, firm, very sticky, very plastic; many very fine and fine roots and also many medium saltgrass roots; many fine tubular and interstitial pores; strongly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 3 to 5 inches thick.

C1--3 to 8 inches, gray (10YR 6/1) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium prisms that part to moderate fine subangular and angular blocky structure; hard, friable, very sticky, very plastic; many very fine and fine roots; many very fine and common fine tubular, and many fine interstitial pores; strongly effervescent; strongly alkaline (pH 8.8); gradual smooth boundary. 4 to 6 inches thick.

C2--8 to 16 inches, light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; moderate medium and fine granular structure; hard, friable, sticky, plastic; many very fine and common fine roots; many many very fine, and few fine interstitial and tubular pores; strongly effervescent; strongly alkaline (pH 8.5); clear wavy boundary. 6 to 10 inches thick.

C3ca--16 to 23 inches, light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, sticky, plastic; common very fine and few fine roots; common very fine and fine tubular pores; common coarse faint light brownish gray (10YR 6/2) nodules; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 5 to 10 inches thick.

C4ca--23 to 31 inches, white (2.5Y 8/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, very sticky, very plastic; few very fine and fine roots; many very fine and few fine tubular pores; 15 percent light brownish gray (10YR 6/2) lime nodules that range from 1/4 to 2 inches diameter; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 8 to 14 inches thick.

C5ca--31 to 44 inches, white (2.5Y 8/1) heavy silty clay loam, light brownish gray (2.5Y 6/2) moist; massive; hard, firm, very sticky, very plastic; few very fine and fine roots; many very fine and fine tubular pores; 25 to 30 percent of this horizon consists of large, irregularly

shaped, somewhat honeycombed, extremely hard lime nodules that range up to 4 inches diameter; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 10 to 20 inches thick.

C6ca--44 to 58 inches, white (2.5Y 8/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; very hard, firm, very sticky, very plastic; no plant roots; few very fine, fine, and medium tubular pores; 60 to 75 percent of this horizon consists of irregularly shaped nodules that range up to about 7 inches in diameter; tubular pores described occur in this nodular material; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 10 to 16 inches thick.

C7ca--58 to 72 inches, white (5Y 8/1) light silty clay loam, light olive gray (5Y 6/2) moist; massive; very hard, firm, sticky, plastic; no plant roots; few very fine tubular pores in nodules; 30 percent of this horizon consists of irregularly shaped nodules similar to those in the horizon above; very strongly effervescent; strongly alkaline (pH 8.6).

Depth to the lime nodules in the Cca horizons ranges from 13 to 26 inches. These soils are usually moist due to capillary moisture from ground water. Dry periods may occur in the summer and fall. The soil is strongly or very strongly alkaline.

Duffer silty clay loam, slightly saline-alkali (25).--This soil occurs as elongated, irregular-shaped areas on nearly level lake plains and terraces with slopes of 0 to 2 percent. The profile is similar to that described as representative for the series except that it has marly silty clay horizons at 20 inches, and extends to 51 inches. Included in delineated areas are about 15 percent Needle Peak silt loam, Ocala silty clay loam, Pocker silty clay loam, Preble silt loam, and Prida silt loam.

The native vegetation is principally basin wildrye, saltgrass, rabbitbrush, and buffaloberry.

Duffer soil is used mainly as range for livestock. It is not well suited for irrigated crop production because of salinity, alkali, and wetness. If used for crop production, the choice of crops should be limited to saline-alkali crops.

Land capability unit IVw-61, irrigated; VIIw-221, dryland.

Range site Saline meadow NV-24-9.

Wildlife suitability group 2-2-I, irrigated; --24, dryland.

Duffer silty clay loam, strongly saline-alkali (26).--This soil occurs as elongated, rectangular shaped areas on nearly level lake plains and terraces with slopes of 0 to 2 percent. It has the profile described as representative for the series. Included in delineated areas are about 15 percent Ocala silty clay loam, Pocker silty clay loam, Preble silt loam, and Prida silt loam.

The native vegetation is principally black greasewood, rabbitbrush, buffaloberry, saltgrass, and alkali sacaton.

This soil is used mainly as range for livestock. It is not suited for irrigated crop production because of severe saline-alkali and wetness.

Land capability unit VIIw-221, dryland.

Range site Saline bottom NV-24-10.

Wildlife suitability group --34, dryland.

Dun Glen Series

The Dun Glen series are deep, well drained soils formed in alluvium from mixed rock sources including quartzite, rhyolite, sandstone, shale, slate, limestone, basalt, and andesite with a loess mantle of volcanic ash. They are on nearly level to gently sloping alluvial fans and terraces with slopes ranging from 0 to 4 percent. Native vegetation is shadscale, bud sagebrush, squirreltail, cheatgrass, pepperweed and mustards. Elevations are 4,000 to 5,500 feet. The climate is semi-arid with a mean annual precipitation of 6 to 8 inches; a mean annual temperature of 46° to 50° F.; and a frost-free season of 100 to 120 days.

Typical Dun Glen profiles have two main parts: (1) pale brown loam or silt loam, calcareous in the lower part, about 15 inches thick; and (2) light brownish gray or light yellowish brown, calcareous, fine sandy loam extending to 60 inches.

Dun Glen soils have moderately permeability. Effective rooting depth is more than 60 inches. Available water capacity is moderately high to high. Runoff is slow, and the erosion hazard is slight to moderate.

A representative profile of Dun Glen loam is in an area of Pershing County, Nevada about 19 miles south of Winnemucca, approximately 1,600 feet north and 400 feet east of the southwest corner of section 26, T. 33 N., R. 38 E.

A1--0 to 3 inches, pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak thick platy structure; slightly hard, friable, nonsticky, nonplastic; few fine and medium

roots; many very fine vesicular pores; moderately alkaline (pH 8.4); clear wavy boundary. 2 to 5 inches thick.

B2--3 to 10 inches, pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak very fine angular blocky structure; slightly hard, friable, nonsticky, nonplastic; common very fine and fine roots; common very fine interstitial and tubular pores; moderately alkaline (pH 8.4); clear wavy boundary. 6 to 10 inches thick.

C1ca--10 to 15 inches, pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine roots; few very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 4 to 10 inches thick.

C2ca--15 to 47 inches, light brownish gray (10YR 6/2) fine sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky, nonplastic; few very fine roots; common very fine interstitial pores; common fine seams of lime; violently effervescent; very strongly alkaline (pH 9.2); clear wavy boundary. 24 to 36 inches thick.

C3ca--47 to 61 inches, light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky, nonplastic; few very fine roots; few very fine interstitial pores; common fine seams of lime; violently effervescent; strongly alkaline (pH 8.8).

The solum is 10 to 15 inches thick. It is mildly to moderately alkaline and noneffervescent, or it may be slightly effervescent in the lower part. The C horizons are fine sandy loam or very fine sandy loam. Thin strata of silt loam, loam, sandy loam, or coarse sandy loam are in some profiles. Strata with as much as 15 percent hard and firm durinodes are in some profiles. The C horizons are moderately to strongly alakline and strongly to violently effervescent. In some areas these soils are underlain by gravel at depths below 40 inches.

Dun Glen loam, 0 to 2 percent slopes (27).--This soil occurs as irregularly shaped areas on alluvial fans and terraces. It has the profile described as representative for the series. Included in delineated areas are about 15 percent Adelaide, Blackhawk, Golconda, Ragland, and Weso soils.

This soil is used principally for rangeland and wildlife. It is well suited for irrigated cropland. A few small areas have been converted to cropland where irrigation water is provided by pumping from deep wells. Principal crops are alfalfa, small grains, and potatoes.

Land capability unit IIc-1, irrigated; VIIc-240, dryland

Range site Desert loamy NV-24-2.

Wildlife suitability group 1-4-I, irrigated; --42, dryland.

Dun Glen loam, 2 to 4 percent slopes (28).--This soil occurs as trinangular shaped areas on alluvial fans and terraces. The soil is similar to that described as representative for the series except it has 5 to 15 percent gravel throughout the profile and slopes are 2 to 4 percent. Included in delineated areas are about 15 percent Adelaide, Blackhawk, Golconda, Raglan, and Weso soils.

This soil is used principally for rangeland and wildlife. It is moderately well suited for irrigation. If irrigation water is provided many crops can be grown.

Land capability unit IIe-20, irrigated; VIIc-240, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group 1-4-I, irrigated; --42, dryland.

Dun Glen loam, gravel substratum, 0 to 2 percent slopes (29).--This soil occurs as elongated, narrow areas on alluvial fans and terraces. It has a profile similar to that described as representative for the series except it is underlain by gravel at 40 inches. Included in delineated areas are about 15 percent Adelaide, Blackhawk, Golconda, and Weso soils, and other Dun Glen soils.

This soil is used principally for rangeland and wildlife. It is well suited for irrigated cropland. If irrigation water is provided, all adapted crops can be grown.

Land capability unit IIs-45, irrigated; VIIc-240, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group 1-4-I, irrigated; --42, dryland.

Golconda Series

The Golconda series consists of moderately deep, well drained soils. They formed in alluvium from quartzite, rhyolite, chert, limestone, basalt, andesite, slate, shale, and tuff with a mantle of loess that contains volcanic ash. Slopes are 2 to 30 percent. They are on gently sloping to moderately steep alluvial fans, terraces, and low foothills at elevations of 4,500 to 5,800 feet. The native vegetation is principally shadscale and bud sagebrush with some cheatgrass, annual mustards, horsebrush, and Sandberg bluegrass. The climate is semi-arid with a mean annual precipitation of 6 to 8 inches; mean annual temperature is 45° to 50° F.; and the frost-free season is 100 to 120 days.

Typical Golconda profiles have four main parts: (1) pale brown silt loam about 10 inches thick; (2) brownish yellow gravelly clay loam about 13 inches thick; (3) very pale brown strongly cemented duripan about 13 inches thick; and (4) very pale brown, weakly cemented, very gravelly loamy coarse sand extending to 60 inches.

Golconda soils have slow permeability. Effective rooting depth is 20 to 30 inches. Available water capacity is moderately low to moderately high. Runoff is slow to moderately rapid depending upon slopes, and the erosion hazard is moderate to high.

A representative profile of Golconda silt loam is in an area of Pershing County, Nevada about 30 miles south of Winnemucca, approximately 1,200 feet east of the center of section 19, T. 32 N., R. 39 E.

A11--0 to 3 inches, pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate, medium platy parting to moderate very fine granular structure; soft, very friable, nonsticky, nonplastic; common fine and very fine roots; common fine vesicular, and many very fine interstitial pores; moderately alkaline (pH 8.0); abrupt smooth boundary. 3 to 5 inches thick.

A12--3 to 7 inches, pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common very fine roots; common very fine tubular pores; moderately alkaline (pH 8.0); clear smooth boundary. 3 to 5 inches thick.

B1--7 to 10 inches, light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common very fine roots; common very fine tubular pores; strongly alkaline (pH 8.6); abrupt wavy boundary. 3 to 5 inches thick.

B2t--10 to 23 inches, brownish yellow (10YR 6/6) gravelly clay loam, strong brown (10YR 4/4) moist; weak, fine prismatic parting to strong fine and medium angular blocky structure; very hard, very firm, sticky, plastic; few medium and common very fine roots; common very fine interstitial and many very fine tubular pores; common moderately thick clay films on ped faces and in pores; common fine distinct white (10YR 8/2) lime threads, and common coarse prominent white (10YR 8/2) soft lime masses; 15 percent gravel, some is undercoated with moderately thick lime; strongly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. 11 to 15 inches thick.

IIClsicam--23 to 36 inches, very pale brown (10YR 8/3) strongly cemented duripan, very pale brown (10YR 7/4) moist; massive; extremely hard, extremely firm; few very fine roots in fractures; 45 percent gravel; strongly effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary. 10 to 20 inches thick.

IIC2ca--36 to 60 inches, very pale brown (10YR 8/4) weakly lime cemented, very gravelly coarse sand, light yellowish brown (10YR 6/4) moist; massive; very hard, firm, nonsticky, nonplastic; few very fine roots; 65 percent gravel; strongly effervescent; moderately alkaline (pH 8.4).

Thickness of the solum and depth to the strongly cemented hardpan ranges from 20 to 30 inches. These soils are usually dry from late spring to late fall. The mean annual soil temperature is 49° to 54° F. Reaction of the A hroizons is mildly to moderately alkaline. The B2t horizons are gravelly clay loam, clay loam, gravelly silty clay loam or silty clay loam with strata of heavy loam in some profiles. Average clay content is 25 to 35 percent and average gravel content is 5 to 30 percent. They are slightly to strongly effervescent and moderately to very strongly alkaline. The hardpans have discontinuous lenses or masses of indurated material in some profiles. Gravel content ranges from 5 to 45 percent. Normally the hardpan is underlain by loose to weakly cemented gravel. The gravel is lacking in some profiles.

Golconda silt loam, 2 to 8 percent slopes (30).--This soil occurs as large, elongated, irregularly shaped areas. They occur on undulating and dissected alluvial fans and terraces. This soil has the profile described as representative for the series. Included in delineated areas are about 15 percent Blackhawk, Adelaide, and other Golconda soils.

This soil is used primarily for limited livestock grazing and wildlife habitat. It is not suited for irrigated cropland.

Land capability unit VIIc-240, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group --43, dryland.

Golconda silt loam, 8 to 15 percent slopes (31).--This soil occurs as large, elongated, irregularly shaped areas on strongly sloping, dissected, alluvial fans and terraces. This soil is similar to that described as representative for the series except the hardpan is thinner, and underlying gravels occur at depths of 25 to 30 inches. Slopes are 8 to 15 percent. Included in delineated areas are about 15 to 20 percent Adelaide, Blackhawk, and Weso soils, and Golconda soils with slopes of 15 to 30 percent.

This soil is used principally for rangeland and wildlife habitat. It is not suited for irrigated cropland.

Land capability unit VIIc-240, dryland.

Range site Desert loamy NV-24-2.

Wildlife suitability group --43, dryland.

Goldrun Series

The Goldrun series consists of very deep, somewhat excessively drained soils. They formed in eolian and lacustrine sands from a wide mixture of rocks including granodiorite, rhyolite, quartzite, sandstone, limestone, dolomite, shale, slate, tuff, and basalt with some influence from volcanic ash. Slopes are 0 to 15 percent. They are in or consist of wind-deposited dunes and lakeshore terraces which are sometimes superimposed over lacustrine sediments and alluvial fans. Elevations are 3,600 to 5,000 feet. Native vegetation is big sagebrush, rabbitbrush, hairy horsebrush, spiny hopsage, fourwing saltbush, needleandthread grass, Indian ricegrass, cheatgrass, and scurfpea. The climate is semi-arid with a mean annual precipitation of 6 to 8 inches; mean annual temperature of 45° to 50° F.; and the frost-free season is 100 to 120 days.

Typical Goldrun profiles have two main parts: (1) light brownish gray loamy fine sand or fine sand about 24 inches thick; and (2) light gray or light brownish gray, calcareous, loamy fine sand or fine sand extending to 60 inches or more.

Goldrun soils have rapid permeability. Effective rooting depth is 60 inches. Available water capacity is moderately low to moderately high. Runoff is very slow. The erosion hazard is high, especially by wind.

A representative profile of Goldrun loamy fine sand is in an area of Humboldt County, Nevada in Winnemucca, about 1/2 mile west of Bridge Street on Haskell Street or Grass Valley Road, and

50 feet south of Haskell Street, approximately 1,300 feet north and 500 feet east of the southwest corner of section 29, T. 36 N., R. 38 E.

A1--0 to 7 inches, light brownish gray (10YR 6/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; massive to single grained; loose dry or moist, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; moderately alkaline (pH 8.2); clear smooth boundary. 5 to 9 inches thick.

C1--7 to 24 inches, similar to surface soil in color, fine sand; massive; soft, loose, nonsticky, nonplastic; roots and pores as in surface horizon; moderately alkaline (pH 8.2); clear wavy boundary. 12 to 20 inches thick.

C2--24 to 42 inches, light gray (10YR 7/2) fine sand, grayish brown (10YR 5/2) moist; appears to contain particles of ash; massive; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; many very fine interstitial pores; slightly effervescent; strongly alkaline (pH 8.5); clear wavy boundary. 12 to 20 inches thick.

C3--42 to 67 inches, light brownish gray (10YR 6/2) fine sand, brown (10YR 5/3) moist; single grained; loose when dry or moist, nonsticky, nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary. 18 to 28 inches thick.

IIC4--67 to 77 inches, light brownish gray (10YR 6/2) gravelly and cobbly loamy fine sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; roots and pores as in horizon above; 50 percent rounded gravel and cobble that have a thin white coating of lime; slightly effervescent; strongly alkaline. This horizon includes a stone line of cobble and gravel at 67 inches.

Goldrun soils are dry more than half the time but not more than three-fourth the time the soil temperature is above 41° F. Dry periods are during the summer and fall months. The mean

annual soil temperature is 47° to 52 ° F. Depth to lime ranges from 17 to 29 inches. Reaction of the upper part of the profile is mildly to moderately alkaline. The lower part of the profile is slightly to strongly effervescent, and moderately to strongly alkaline. The 10 to 40-inch control section is fine sand with occasional strata of loamy fine sand.

Goldrun fine sand, 4 to 15 percent slopes (32).--This soil occurs as many, large, round and elongated sand dunes superimposed over lacustrine deposits and alluvial fans. It has a profile similar to that described as representative for the series except it has a fine sand surface and lacks gravel and cobbles in the lower, underlying C horizons. Included in delineated areas are about 15 percent Rad, Rebel, and Valmy soils, and other Goldrun soils, and 5 to 10 percent Benin and Preble soils.

This soil is used principally for rangeland and wildlife habitat. It has fair suitability for irrigated cropland. If irrigation water is provided crops can be grown under sprinkler irrigation.

Land capability unit IVs-43, irrigated; VIIs-224, dryland.

Range site Sand hills NV-24-1.

Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Goldrun loamy fine sand, 0 to 2 percent slopes (33).--This soil occurs as narrow, rounded, and elongated areas on lakeshore bars and terraces. It has the profile described as representative for the series. Included in delineated areas are about 15 percent McConnel, Orovada, Rad, Rebel, and Valmy soils.

This soil is used principally for rangeland and wildlife habitat. It is moderately well suited for irrigated cropland with sprinkler irrigation.

Land capability unit ivs-43, irrigated; VIIs-224, dryland.
Range site Sand hills NV-24-1.
Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Goldrun loamy fine sand, undulating (34).--This soil occurs as broad, circular-shaped, undulating areas of eolian sands which have been deposited on lacustrine terraces and alluvial fans. It has a profile that is similar to that described as representative for the series except it is loamy fine sand throughout or the lower horizons consist of unconforming lacustrine or alluvial deposits below 40 inches. Included in delineated areas are about 10 percent Rad, Rebel, Valmy, and other Goldrun soils, and 5 to 10 percent Benin and Preble soils.

This soil is used principally for rangeland and wildlife habitat. It is moderately well suited for irrigated cropland with sprinkler irrigation.

Land capability unit IVs-43, irrigated; VIIs-224, dryland.
Range site Sand hills NV-24-1.
Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Goldrun-Benin complex, undulating (35).--This complex occurs as large, irrgularly shaped areas where eolian sands have been deposited on lacustrine terraces. It consists of about 60 percent Goldrun fine sand, 0 to 4 percent slopes, and about 25 percent Benin silt loam, 0 to 2 percent slopes. The Goldrun soils have a profile similar to that described as representative for the series except the surface is fine sand on slopes of 0 to 4 percent. They are on low dunes superimposed over old lake beds. The Benin soils have the profile described as representative for the series. They are in areas where the lake beds are exposed between the sand dunes. Included are about 20 percent Rad, Rebel, Valmy, and other Goldrun soils.

The Goldrun soils have a native plant cover of big sagebrush, rabbitbrush, hairy horsebrush, needleandthread grass, Indian ricegrass, and scurfpea; on Benin soils it is mainly shadscale, bud sagebrush, and squirreltail. The Goldrun soils have rapid permeability and Benin soils have very slow permeability. The effective rooting depth for Goldrun soils is more than 60 inches; for Benin soils it is 20 to 40 inches. Available water capacity is moderately low to moderately high for Goldrun soils, and high for Benin soils. The runoff for these soils is very slow. The Goldrun soils have a high erosion hazard by wind, and Benin soils have a slight erosion hazard.

This complex is used principally for rangeland and wildlife habitat. Goldrun soils are moderately well suited for irrigated farming under sprinkler irrigation. The Benin soils are poorly suited for irrigated farming.

Land capability unit IVs-43, irrigated; VIIs-224, dryland.

Goldrun component: Range site Sand hills NV-24-1.

Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Benin component: Range site Desert loamy NV-24-2.

Wildlife suitability group 2-4-I, irrigated; --43, dryland.

Goldrun-Benin complex, rolling (36).--This complex occurs as large, rounded, and elongated sand dunes superimposed over old lacustrine terraces. It consists of about 50 percent Goldrun fine sand, 4 to 15 percent slopes, and about 30 percent Benin silt loam, 0 to 2 percent slopes. The Goldrun soils have a profile that is similar to that described as representative for the series except the surface is fine sand with slopes of 4 to 15 percent. They are on the large sand dunes. The Benin soils have the profile described as representative for the series. They are in areas where the lake beds are exposed between the dunes. Included are about 20 percent Rad, Rebel, Valmy, and other Goldrun soils.

Goldrun soils have a native plant cover of big sagebrush, rabbitbrush, hairy horsebrush, needleandthread grass, Indian ricegrass, and scurfpea, and on Benin soils it is mainly shadscale, bud sagebrush, and squirreltail. Permeability on Goldrun soils

is rapid; on Benin soils it is very slow. Effective rooting depth for Goldrun soils is more than 60 inches; for Benin soils it is 20 to 40 inches. Available water capacity is moderately low to moderately high for Goldrun soils, and high for Benin soils. The runoff on these soils is very slow. Erosion hazard is high by wind on Goldrun soils, and it is slight on Benin soils.

The soils in this complex are used principally for rangeland and wildlife habitat. The Goldrun soils have fair suitability for irrigated farming under sprinkler irrigation. The Benin soils are poorly suited for irrigated farming.

Land capability unit IVs-43, irrigated; VIIs-224, dryland.

Goldrun component: Range site Sand hills NV-24-1.

Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Benin component: Range site Desert loamy NV-24-2.

Wildlife suitability group 2-4-I, irrigated; --43, dryland.

Goldrun-Preble complex (37).--This complex occurs as large, irregularly shaped areas where eolian sand have been deposited on low lying stream terraces. It consists of about 55 percent Goldrun fine sand, 4 to 15 percent slopes, and about 30 percent Preble fine sandy loam. The Goldrun soils have a profile that is similar to that described as representative for the series except the surface is a fine sand with 4 to 15 percent slopes. They are on the large sand dunes. The Preble soils have a profile similar to that described for the series except the surface is fine sandy loam. They are in

areas where the surface of the terraces is exposed between the dunes. Included are about 15 percent Sonoma, Valmy, and other Goldrun soils.

The native plant cover on Goldrun soils is big sagebrush, rabbitbrush, hairy horsebrush, needleandthread grass, Indian ricegrass, and scurfpea, and on Preble soils it is greasewood, rabbitbrush, saltgrass, and squirreltail. Goldrun soils have rapid permeability, and Preble soils have very slow permeability. Effective rooting depth for Goldrun and Preble soils is more than 60 inches. Available water capacity for Goldrun soils is moderately low to moderately high, and for Preble soils it is moderately high to high. Runoff is very slow for these soils. The erosion hazard by wind is high on Goldrun soils, and it is slight on Preble soils. The Preble soils have a seasonal high water table at 3 to 5 feet.

The Goldrun and Preble soils are used principally for rangeland and wildlife habitat. They are poorly suited for irrgated farming.

Land capability unit IVs-43, irrigated; VIIs-224, dryland.

Goldrun component: Range site Sand hills NV-24-1.

Wildlife suitability group 3-4-I, irrigated; --43, dryland.

Preble component: Range site Semidesert sandy NV-24-17.

Wildlife suitability group 2-4-I, irrigated; --34, dryland.

Golsum Series

The Golsum series consists of well drained soils. They formed in residual materials and colluvium weathered from sandstone, chert, shale and quartzite. Slopes are 30 to 50 percent. They occur at elevations of 5,500 to 7,000 feet. Vegetation is big sagebrush, rabbitbrush, squirreltail, Idaho fescue, cheatgrass, Sandberg bluegrass, Thurber's needlegrass, phlox, balsamroot, hawksbeard, astragalas, daisy, penstemon and death camas. The mean annual precipitation is 10 to 12 inches; mean annual air temperature is 40° to 45° F.; and the frost-free season is 80 to 100 days.

Typical Golsum soil profiles have three main parts: (1) a surface layer of brown very stony loam about 9 inches thick; (2) brown or yellowish brown very gravelly clay about 22 inches thick; and (3) weathered quartzite bedrock.

The Golsum soils are slowly permeable. Effective depth is 20 to 40 inches. Available water capacity is low. Runoff is rapid and the erosion hazard is high.

Representative profile of Golsum very stony loam is located in an area of Humboldt County, Nevada approximately 4 miles southeast of Winnemucca at a site 1,400 feet south of the northeast corner of section 11, T. 35 N., R. 38 E. The surface is covered by about 22 percent gravel, 8 to 12 percent cobbles, 1 to 3 percent stones, and .1 percent boulders.

A11--0 to 3 inches, brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine

and fine interstitial and common very fine tubular pores; 20 percent gravel; neutral (pH 7.0); clear smooth boundary. 2 to 4 inches thick.

A12--3 to 9 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak, fine to medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine interstitial and common very fine tubular pores; 20 percent gravel; neutral (pH 7.0); clear smooth boundary. 4 to 8 inches thick.

B21t--9 to 16 inches, brown (10YR 5/3) gravelly clay, dark brown (10YR 3/3) moist; weak, very fine subangular blocky structure; slightly hard, very friable, sticky, plastic; common very fine, fine and medium roots; few very fine interstitial and common very fine and fine tubular pores; common thin clay films on ped faces and in pores; 30 percent gravel; neutral (pH 7.2); abrupt wavy boundary. 2 to 8 inches thick.

B22t--16 to 24 inches, yellowish brown (10YR 5/4) very gravelly clay, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky, plastic; few very fine roots; common very fine tubular pores; many thin and few moderately thick clay films on ped faces and in pores and coating sand grains and gravel fragments; 50 percent gravel; neutral (pH 7.2); abrupt wavy boundary. 6 to 10 inches thick.

B3tca--24 to 31 inches, pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak fine angular blocky structure; slightly hard, very friable, sticky, plastic; few very fine roots; common fine interstitial pores; 50 percent gravel; strongly effervescent in soft masses and seams, and slightly effervescent in matrix; strongly alkaline (pH 8.6); abrupt irregular boundary. 6 to 10 inches thick.

C1--31 to 34 inches, yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive, but rock structure is evident (paralithic contact); very hard, firm, sticky, plastic; about 60 percent gravel; strongly effervescent in seams; strongly alkaline (pH 8.6).

Thickness in solum and depth to paralithic weathered bedrock ranges from 20 to 40 inches. The mean annual soil temperature ranges from 40° to 45° F., and the mean summer temperature ranges from 55° to 60° F. These soils are noneffervescent and neutral throughout. Textures of the B2t horizons are clay loam or clay with weighted average clay content of 35 to 45 percent. There are 35 to 55 percent coarse fragments.

Golsum-Graley association (38).--This association occurs as elongated, rectangular and irregularly shaped areas on steep, convex mountain slopes. It consists of about 45 percent Golsum very stony loam, 30 to 50 percent slopes and 35 percent Graley very stony loam, 30 to 50 percent slopes. These soils have the profiles described as representative for their respective series. Golsum soils occupy side slopes within delineated areas and Graley soils occupy ridge tops. This unit as presently mapped contains inclusions of 15 to 20 percent other soils similar to Golsum and Graley soils including Pernty soils, soils similar to Golsum soils which are on 5 to 10 percent slopes and underlain by silica-cemented hardpan, Golsum-like soils on 8 to 30 percent slopes, and some rock outcrop.

The Golsum soils have a native plant cover similar to that described for the series. The native vegetation on Graley soils is big sagebrush, rabbitbrush, squirreltail, Idaho fescue, lupine and phlox. The Golsum and Graley soils are slowly permeable. The rooting depth is 20 to 40 inches for Golsum soils and 10 to 20 inches for Graley soils. The available water capacity for these soils is low. They have rapid runoff, and the erosion hazard is high.

Golsum and Graley soils are not suitable for irrigated farming. They are used principally for rangeland and wildlife habitat.

Golsum component: Land capability unit VIIs-239, dryland

Range site Loamy NV-24-13, 10 to 12 inch precipitation zone

Wildlife suitability group --43, dryland.

Graley component: Land capability unit VIIs-237, dryland

Range site Loamy NV-24-13, 10 to 12 inch precipitation zone

Wildlife suitability group --44, dryland.

Gosumi Series

The Gosumi series consists of well drained soils. They formed in micaeous quartz, grit, sandstone, shale and limestone. Slopes are 30 to 50 percent. The elevation is 5,500 to 7,000 feet. Mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is low sagebrush, big sagebrush, Idaho fescue, lupine and phlox.

Typical Gosumi soil profiles have four main parts: (1) a surface layer of grayish brown gravelly loam about 8 inches thick; (2) brown or yellowish brown very gravelly clay about 24 inches thick; (3) a yellowish brown gravelly sandy loam about 20 inches thick; and (4) weathered sandstone bedrock.

The Gosumi soils are very slowly permeable. Effective depth is 40 to 60 inches. Available water capacity is moderately low to moderately high. Runoff is rapid and the erosion hazard is high.

Representative profile of Gosumi stony loam is located in an area of Humboldt County, Nevada approximately 4 miles southeast of Winnemucca in the foothills at the north end of Sonoma Range, approximately 2,400 feet west and 700 feet north of the southeast corner of section 11, T. 35 N., R. 38 E. The surface is covered with about 17 percent gravel and 2 percent cobbles.

A11--0 to 3 inches, grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 15 percent gravel; neutral (pH 7.0); clear smooth boundary. 2 to 4 inches.

A12--3 to 8 inches, grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and few medium roots; many very fine interstitial pores; 15 percent gravel; neutral (pH 6.8); abrupt wavy boundary. 4 to 6 inches thick.

B1t--8 to 13 inches, brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate very fine subangular blocky structure; hard, friable, sticky, plastic; common very fine, fine and few medium roots; many very fine interstitial and few very fine tubular pores; many thin clay films on ped faces and in pores; 45 percent gravel; neutral (pH 6.8); clear wavy boundary. 4 to 6 inches thick.

B21t--13 to 21 inches, yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; moderate, fine subangular blocky structure; hard, friable, very sticky, very plastic; common very fine and fine roots; common very fine tubular pores; common thin clay films on ped faces and in pores; 35 percent gravel; neutral (pH 6.8); clear wavy boundary. 6 to 10 inches thick.

B22t--21 to 32 inches yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; moderate, medium angular and subangular blocky structure; very hard, firm, very sticky, very plastic; few very fine and fine roots; common very fine tubular pores; many thin clay films on ped faces and in pores; 35 percent gravel; neutral (pH 6.8); clear wavy boundary. 10 to 12 inches thick.

B31t--32 to 42 inches, yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine interstitial and few very fine tubular pores; many thin clay films coating and bridging sand grains and gravel fragments; 25 percent gravel; neutral (pH 6.8); clear wavy boundary. 8 to 12 inches thick.

B32t--42 to 50 inches, light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist, with many fine distinct white (10YR 8/3) lime mottles; massive; hard, friable, slightly sticky, nonplastic; few very fine and fine roots; many very fine interstitial and few very fine tubular pores; few thin clay films bridging and coating sand grains and gravel fragments; 40 percent gravel; violently effervescent in lime mottles; moderately alkaline (pH 8.4); abrupt irregular boundary. 6 to 10 inches thick.

C1--50 to 56 inches, light yellowish brown (10YR 6/4) fractured sandstone bedrock (10YR 5/2) moist, with yellowish red (5YR 5/6) iron mottles and with lime coatings on surfaces of rock fragments and in cracks.

Thickness of solum and depth to paralithic weathered bedrock ranges from 40 to 60 inches. The mean annual soil temperature is 42° to 47° F., and the mean summer soil temperature is 59° to 64° F. Texture of the upper 20 inches of the B2t horizon is dominantly clay loam or clay but ranges to include strata of sandy loam and sandy clay loam. The weighted average clay content ranges from 35 to 50 percent. There are 35 to 50 percent coarse fragments. The B2t horizons are noneffervescent and neutral in reaction. The B3 horizons have sandy loam textures. The lower parts of the B3 below about 38 to 42 inches are effervescent and moderately to strongly alkaline in reaction.

Gosumi series have been mapped only in Nomara-Gosumi association (54).

Grayley Series

The Graley series consists of well drained soils. They formed in dark, siliceous argillite and slate, altered andesitic lava, limestone and quartzite. Slopes are 30 to 50 percent Elevations range from 5,500 to 7,000 feet. The mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is big sagebrush, rabbitbrush, squirreltail, Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass, cheatgrass, lupine, phlox, astragalas, hawksbeard, and balsamroot.

Typical Graley soil profiles have three main parts: (1) a surface layer of grayish brown very stony loam about 3 inches thick; (2) brown or yellowish brown very gravelly clay loam about 15 inches thick; and (3) quartzite bedrock.

The Graley soils are slowly permeable. Effective depth is 12 to 20 inches. Available water capacity is low. Runoff is rapid and the erosion hazard is high.

Representative profile of Graley very stony loam is in an area of Humboldt County, Nevada approximately 4.5 miles southeast of Winnemucca at a site 1,800 feet east and 2,500 feet south of the northwest corner of section 12, T. 35 N., R. 38 E. The surface is covered with 4 to 8 percent gravel, 4 to 8 percent cobbles, 3 to 6 percent stones, 1 to 3 percent boulders and .1 percent rock outcrop.

A11-- 0 to 3 inches, grayish brown (10YR 5/2) very stony loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky, nonplastic;

many very fine roots; many very fine interstitial pores; 50 percent gravel; neutral (pH 6.8); clear wavy boundary. 2 to 4 inches thick.

B21t--3 to 10 inches, brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; weak very fine subangular blocky structure; slightly hard, friable, very sticky, very plastic; common very fine roots; common very fine interstitial and tubular pores; many moderately thick, and common thin clay films on ped faces and in pores; 50 percent gravel; neutral (pH 7.0); clear wavy boundary. 5 to 8 inches thick.

B22t--10 to 18 inches yellowish brown (10YR 5/4) very gravelly clay loam, dark brown (10YR 4/3) moist; common fine angular and subangular blocky structure; hard, friable, very sticky, very plastic; few very fine roots; common very fine tubular pores; many thin clay films on ped faces and in pores; 65 percent gravel; neutral (pH 7.2); abrupt irregular boundary. 5 to 8 inches thick.

C1--18 to 28 inches, light yellowish brown (10YR 6/4) fractured quartzite bedrock, dark yellowish brown (10YR 4/4) moist.

Thickness of the solum and depth to bedrock ranges from 12 to 20 inches. The mean annual soil temperature ranges from 42° to 47° F., and the mean summer soil temperature is 59° to 64° F. These soils are noncalcareous and neutral in reaction. Textures of the B2t horizons are clay loam or clay with a weighted average clay content of 35 to 50 percent. There are 40 to 65 percent by volume of coarse fragments. Structure is weak or moderate, very fine or fine subangular blocky.

Graley-Percoun association (39).--This association occurs on steep mountain slopes. It consists of about 45 percent Graley very stony loam, 30 to 50 percent slopes, and 20 percent Percoun extremely

stony silt loam, 30 to 50 percent slopes. These soils have the profiles described as representative for their respective series. The Graley soils are on east and northeast facing slopes. They have bedrock at 12 to 20 inches. Percoun soils are more commonly on southeast facing slopes and have bedrock at 20 to 40 inches. Included in delineated areas are about 15 percent Dryn, Spinlin, Harcany, Panin and Winevada soils, and rock outcrop.

The Graley soils have a native plant cover of big sagebrush, rabbitbrush, lupine, hawksbeard, arrowleaf balsamroot, mules ear wyethia, bluebunch wheatgrass, Sandberg bluegrass, and cheatgrass. Vegetation on Percoun soils is big sagebrush, rabbitbrush, currant, juniper, arrowleaf balsamroot, mules ear wyethia, lupine, hawksbeard, bluebunch wheatgrass, Sandberg bluegrass, Nevada bluegrass and cheatgrass.

Graley soils are slowly permeable and Percoun soils are very slowly permeable. Available water capacity is moderately low for these soils. They have rapid to very rapid runoff and the erosion hazard is high.

This association is not suitable for irrigated cropland. They are used principally for rangeland and wildlife habitat.

Graley component: Land capability unit VIIs-237, dryland
Range site Loamy NV-24-13, 10 to 12 inch precipitation zone
Wildlife suitability group --44.

Percoun component: Land capacility unit VIIs-214, dryland
Range site Upland loamy NV-24-21, 12 to 16 inch precipitation zone
Wildlife suitability group --42, dryland.

Granyon Series

The Granyon series consists of moderately deep, well drained soils. They formed in residual material and colluvium weathered from granite. Slopes are 45 to 60 percent. Elevation is 5,000 to 6,400 feet. The mean annual precipitation is 8 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is big sagebrush, rabbitbrush, horsebrush, phlox, cheatgrass, needlegrass, Indian ricegrass and squirreltail.

Typical Granyon soil profiles have four main parts: (1) a surface layer of brown extremely stony sandy loam about 6 inches thick; (2) pale brown gravelly sandy loam about 15 inches thick; (3) pale brown very gravelly loamy sand about 21 inches thick; and (4) granite bedrock.

The Granyon soils are rapidly permeable. Effective depth is 20 to 30 inches. Available water capacity is low to moderately low. Runoff is rapid and the erosion hazard is high.

Representative profile of Granyon extremely stony sandy loam is in an area of Pershing County, Nevada approximately 21 miles southeast of Winnemucca at a site about 500 feet east of the center of section 31, T. 33 N., R. 39 E. The surface is covered with about 30 percent gravel and 6 percent stones.

A1--0 to 6 inches, brown (10YR 6/3) extremely stony sandy loam, dark brown (10YR 4/3) moist; massive; soft, friable, nonsticky, slightly plastic; many fine and very fine roots; many very fine interstitial pores; 30 percent gravel; 6 percent stones on surface; neutral (pH 7.0); clear smooth boundary. 4 to 8 inches thick.

B21--6 to 12 inches, pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky, slightly plastic; many fine and very fine roots; many very fine interstitial pores; 25 percent gravel; neutral (pH 7.2); clear smooth boundary. 4 to 8 inches thick.

B22--12 to 23 inches, pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky, slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; 20 percent gravel; few decomposed granite cobbles that crumble to gravelly coarse sand when displaced; mildly alkaline (pH 7.4); abrupt irregular boundary. 8 to 12 inches thick.

C1--23 to 42 inches, pale brown (10YR 6/3) granitic saprolite (weathered granite), brown (10YR 4/3) moist; massive; hard, firm, few very fine roots in cracks; mildly alkaline (pH 7.4); abrupt wavy boundary. 15 to 25 inches thick.

R--42 to 45 inches, hard granite bedrock.

Solum thickness and depth to the weathered bedrock is 20 to 30 inches. Depth to hard bedrock is 40 to 60 inches. Granyon soils are usually dry but are moist in the late fall, winter and early spring months. The soil texture from 10 inches to the weathered bedrock averages gravelly sandy loam. It has 10 to 18 percent clay and 15 to 30 percent gravel.

Granyon-Shoken association (40).--This association occurs as irregularly shaped areas on steep and very steep convex mountain slopes. It consists of about 45 percent Granyon extremely stony sandy loam, 30 to 50 percent slopes, and 45 percent Shoken cobbly coarse sandy loam, 30 to 50 percent slopes. These soils have the profiles described as representative for their respective series. Granyon soils are on north and east slopes and have weathered granite at 20 to 30 inches. Shoken soils are on south and west slopes and have weathered granite at 10 inches. Included are about 10 to 15 percent Golsum, Graley and Pernty soils, and soils similar to Shoken but with a thin argillic horizon resting on rhyolite bedrock.

The Granyon soils have a native plant cover consisting of big sagebrush, rabbitbrush, horsebrush, phlox, needlegrass, Indian ricegrass, squirreltail and cheatgrass. Native vegetation on Shoken soils is big sagebrush, rabbitbrush, desert peach, horsebrush, eriogonum, needlegrass, Indian ricegrass and cheatgrass. These soils have rapid permeability. Rooting depth is 20 to 30 inches for Granyon soils and less than 10 inches for Shoken soils. Available water capacity for Granyon soils is low to moderately low and for Shoken soils it is low. They have rapid runoff and the erosion hazard is high.

This association is not suitable for irrigated cropland. They are used principally for rangeland and wildlife habitat.

Granyon component: Land capability unit VIIs-243, dryland

Range site Loamy NV-24-13, 10 to 12 inch precipitation zone

Wildlife suitability group --43, dryland.

Shoken component: Land capability unit VIIs-238, dryland

Range site Loamy NV-24-5, 8 to 10 inch precipitation zone

Wildlife suitability group --43, dryland.

Harcany Series

The Harcany series consists of deep, well drained soils. They formed in residual material and colluvium weathered from argillite, andesite, quartzite, sandstone, shale and slate. Slopes are 50 to 70 percent. The elevation is 7,000 to 9,000 feet. The mean annual precipitation is 12 to 15 inches, mean annual air temperature is 35° to 40° F., and the frost-free season is 40 to 80 days.

Typical Harcany soil profiles have a sequence of two main parts: (1) a surface layer of dark grayish brown stony silt loam about 18 inches thick; and (2) brown very gravelly sandy loam which extends to 72 inches.

The Harcany soils are moderately permeable. Effective depth is 40 to 60 inches. Avaiable water capacity is moderately low to moderately high. Runoff is rapid and the erosion hazard is high.

Representative profile of Harcany stony silt loam is in an area of Humboldt County, Nevada approximately 6 miles southeast of Winnemucca, about 500 feet west and 900 feet north of the southeast corner of section 13, T. 35 N., R. 38 E. The surface is covered with about 2 to 5 percent gravel, 1 percent cobbles, stones and boulders, and .1 percent rock outcrop.

A11--0 to 4 inches, dark grayish brown (10YR 4/2) stony silt loam, very dark brown (10YR 2/2) moist; strong very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and few fine and medium roots; many very fine interstitial pores; 25 percent gravel, 4 percent cobbles and stones; neutral (pH 6.6); clear wavy boundary. 3 to 6 inches thick.

A12--5 to 10 inches, dark grayish brown (10YR 4/2) gravelly silt loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and few fine and medium roots; many very fine interstitial pores; 25 percent gravel, 5 percent cobbles and stones; neutral (pH 6.6); clear wavy boundary. 4 to 8 inches thick.

A13--10 to 18 inches, dark grayish brown (10YR 4/2) gravelly silt loam, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common very fine and few fine and medium roots; many very fine interstitial pores; 40 percent gravel, 20 percent cobbles and stones; neutral (pH 6.6); clear wavy boundary. 6 to 10 inches thick.

C1--18 to 48 inches, brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine interstitial and few very fine tubular pores; 60 percent gravel, 5 percent cobbles and stones; neutral (pH 8.6); clear wavy boundary. 20 to 36 inches thick.

C2--48 to 72 inches, brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky, slightly plastic; few very fine roots; common very fine interstitial and few very fine tubular pores; 50 percent gravel, 20 percent cobbles and stones; neutral (pH 6.8).

The soils are neutral in reaction and noncalcareous throughout. The mean annual soil temperature ranges from 36° to 41° F., and the mean summer soil temperature is 54° to 59° F. The texture of the 10 to 40 inch control section is mainly sandy loam but ranges to include horizons of loam and fine sandy loam. It contains 50 to 75 percent coarse fragments with much of them being larger than 3-inch size. The weighted average clay content is 10 to 15 percent.

Harcany-Winevada association (41).--This association occurs as large, elongated areas on very steep upland slopes. It consists of about 50 percent Harcany stony silt loam, 50 to 70 percent slopes, and about 30 percent Winevada stony loam, 50 to 70 percent slopes. These soils have the profiles described as representative for their respective series. The Harcany soils are on north slopes, and the Winevada soils are on east and south slopes. Included are about 15 to 20 percent Dryn, Percoun, and Winevada soils, and wet soils along streams and rock outcrops.

The vegetation on these soils is similar to that described for their respective series.

The Harcany and Winevada soils have moderate permeability. They have rapid runoff and high erosion hazard.

This association is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Harcany component: Land capability unit VIIs-211, dryland

Range site NV-24-21 Upland loamy, 12 to 16 inch precipitation zone

Wildlife suitability group --42, dryland.

Winevada component: Land capability unit VIIs-211, dryland

Range site NV-24-21 Upland loamy, 12 to 16 inch precipitation zone

Wildlife suitability group --42, dryland.

Humboldt Series

The Humboldt series are deep, poorly and somewhat poorly drained soils formed in alluvium from mixed rock sources with an influence of volcanic ash. They are on smooth, nearly level flood plains at elevations of 3,970 to 4,800 feet with slopes of less than 0.5 percent. The mean annual precipitation is 5 to 8 inches, mean annual temperature is 48° to 52° F., and the frost-free season is 100 to 120 days. The vegetation consists of creeping wildrye, Great Basin wildrye, juncus and sedges. In the more saline affected areas it is saltgrass, greasewood and alkali sacaton.

Typical Humboldt soil profiles have two main parts: (1) a dark gray silty clay loam and silty clay about 18 inches thick; and (2) light gray or light olive gray stratified silty clay loam, silty clay and silt loam extending to 60 inches.

Humboldt soils have moderately slow permeability. Effective depth is more than 60 inches. Available water capacity is high. Runoff is very slow and the erosion hazard is slight. They are subject to occasional or frequent overflow if not protected.

A representative profile of Humboldt silty clay loam is in an area of Humboldt County, Nevada approximately 3 miles northeast of Winnemucca, about 1,700 feet west and 1,500 feet south of the northeast corner of section 9, T. 36 N., R. 38 E.

A11--0 to 3 inches, dark gray (5Y 4/1) silty clay loam, dark olive gray (5Y 3/2) moist; strong fine granular structure; hard, friable, sticky, plastic; many very fine and fine roots; many micro, very fine and fine interstitial pores; effervescent; moderately alkaline (pH 8.2); clear smooth boundary. 2 to 5 inches thick.

A12--3 to 11 inches, dark gray (5Y 4/1) silty clay loam, black (5Y 2/2) moist; strong medium granular structure; hard, firm, very sticky, very plastic; many very fine and fine roots; many micro, very fine and fine interstitial pores; effervescent; moderately alkaline (pH 8.2); gradual smooth boundary. 5 to 8 inches thick.

A13--11 to 18 inches, dark gray (5Y 4/1) silty clay loam, black (5Y 2/2) moist; weak medium prismatic structure; hard, firm, sticky, plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; effervescent; moderately alkaline (pH 8.4); gradual smooth boundary. 5 to 7 inches thick.

C1ca--18 to 26 inches, light olive gray (5Y 6/2) silty clay loam, dark olive gray (5Y 3/2) moist, with white (5Y 8/1) mottles; weak, coarse, prismatic structure; hard, friable, sticky, plastic; common very fine and fine roots; many very fine and common fine tubular and few very fine interstitial pores; few nodular concretions up to 1/2 to 1 inch dimensions; effervescent in matrix, but strongly effervescent in mottles and concretions; moderately alkaline (pH 8.4); clear smooth boundary. 6 to 10 inches thick.

C2ca--26 to 36 inches, light olive gray (5Y 6/2) silty clay loam, dark olive gray (5Y 3/2) moist; weak coarse prismatic structure; hard, friable, sticky, plastic; common fine and fine and medium roots; many very fine and few fine tubular pores; many soft lime nodules and many fresh water crustacean shells; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 6 to 12 inches thick.

C3ca--36 to 52 inches, light gray (5Y 7/1) silty clay loam, dark gray (5Y 4/1) moist, with many fine and medium, white (5Y 8/1) lime mottles; massive; hard, friable, sticky, plastic; common very fine and fine roots; many very fine and fine tubular pores; few crustacean shells; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 10 to 20 inches thick.

C4--52 to 65 inches, light olive gray (5Y 6/2) silty clay loam, dark olive gray (5Y 3/2) moist; massive; hard, friable, sticky, plastic; common very fine and fine roots; common very fine and fine tubular pores; many crustacean shells; strongly effervescent; strongly alkaline (pH 8.6).

These soils are usually saturated for one month or more during most years unless artifically drained. They are calcareous. The 10 to 40 inch control section is somewhat stratified but is dominantly

silty clay loam, silty clay or clay loam. Strata of silt loam and fine clay are not unusual. The average clay content ranges from 35 to 45 percent. Thin layers of volcanic ash are common in the C horizons of the soil profiles. Lime concretions and shellfish shells are also common. Some of these soils are underlain by sand. Excessive soluble salts may range in concentration from none to strong in the upper layers of the profile.

Humboldt silty clay loam, sand substratum (42).--This soil occurs as small, narrow, elongated areas on flood plains. The soil is similar to that described as representative for the soil series except it is underlain at about 30 inches by stratified very fine sandy loam, loamy fine sand, and fine sand which extend to 60 inches or more. Included are about 10 to 15 percent Sonoma and Rose Creek soils, and other kinds of Humboldt soils.

The native vegetation is primarily creeping wildrye, Great Basin wildrye, sedges and juncus.

Available water capacity is moderately high to high. Seasonal high water table is at 2 to 3 feet. This soil is subject to occasional overflow.

This soil is well suited for irrigated cropland if protected from flooding and drained. It is used principally for meadow hay and pasture.

Land Capability unit IIIw-60, irrigated; VIw-220, dryland

Range site NV-24-9 Moist flood plain

Wildlife suitability group 2-2-I, irrigated; --22, dryland.

Humboldt silty clay loam, slightly saline (43).--This soil occurs as irregularly shaped areas on slightly higher positions on flood plains where salts tend to accumulate by capillary movement. This soil has the profile described as representative for the soil series. Included are about 10 to 15 percent Sonoma and Rose Creek soils, and other kinds of Humboldt soils including moderately to strongly saline soils.

The native vegetation is primarily creeping wildrye, Great Basin wildrye, saltgrass, juncus and sedges.

Available water capacity is high. Seasonal high water table is at 1 to 3 feet. It is in the root zone during the winter and spring months. This soil is subject to occasional overflow.

This soil is well suited for irrigated cropland if protected from flooding and drained. It is used principally for meadow hay and pasture.

Land capability unit IVw-61, irrigated; VIw-221, dryland

Range site NV-24-8 Moist flood plain

Wildlife suitability group 2-2-I, irrigated, --23, dryland.

Humboldt silty clay loam, strongly saline (44).--This soil occurs as long, irregular shaped areas on the outer peripheries of flood plains where because of less frequent flooding salts accumulate in greater quantities. This soil is similar to that described as representative to the soil series except it has a thinner A1 horizon, about 11 inches thick, and is strongly saline. Included are about 15 to 20 percent slightly or nonsaline Humboldt soils, and some Sonoma and Rose Creek soils.

The native vegetation is primarily saltgrass, greasewood and alkali sacaton.

Available water capacity is high. Seasonal water table is at 1 to 3 feet. The soil is subject to occasional, brief overflow.

This soil is suited for irrigated cropland if protected from flooding, drained and reclaimed. It is used principally for rangeland or pasture.

Land capability unit IVw-61, irrigated; VIIw-221, dryland

Range site NV-24-7 Saline bottom

Wildlife suitability group 2-2-I, irrigated; --23, dryland.

Humboldt silty clay, slightly saline (45).--This soil occurs as irregularly shaped areas on flood plains. It is similar to that described as representative for the soil series except it has a silty clay surface texture. Included are about 10 to 15 percent Sonoma and Rose Creek soils, and other Humboldt soils.

The native vegetation is primarily creeping wildrye, Great Basin wildrye, saltgrass, juncus and sedges.

There is a seasonal water table at 1 to 3 feet. This soil is subject to occasional overflow.

This soil is suited for irrigated cropland if protected from flooding, drained and reclaimed. It is used principally for meadow hay and pasture.

Land capability unit IVw-68, irrigated; VIw-228, dryland

Range site NV-24-8 Moist flood plain

Wildlife suitability group 2-2-I, irrigated; --23, dryland.

Iver Series

The Iver series consists of well drained soils. They formed in residual material and colluvium weathered from quartz, grit, sandstone, shale and quartzite. Slopes are 30 to 70 percent. They occur at elevations of 5,500 to 7,000 feet. The mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is big sagebrush, rabbitbrush, low sagebrush, Idaho fescue, Sandberg bluegrass, lupine and buckwheat.

Typical Iver soil profiles have two main parts: (1) a surface layer of brown stony silt loam about 22 inches thick; and (2) brown and yellowish brown gravelly loam and gravelly silt loam which extends to 60 inches.

The Iver soils are moderately permeable. Effective depth is 60 inches. Available water capacity is moderately high to high. Runoff is rapid and the erosion hazard is high.

Representative profile of Iver stony silt loam is in an area of Humboldt County, Nevada approximately 4 1/2 miles southeast of Winnemucca, at a site 1,300 feet south and 300 feet west of the northeast corner of section 15, T. 35 N., R. 38 E. The surface is covered with about 1 to 5 percent gravel and 1 to 3 percent cobbles and stones.

A11--0 to 3 inches, brown (10YR 5/3) stony silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; slightly acid (pH 6.2); clear wavy boundary. 2 to 4 inches thick.

A12--3 to 22 inches, brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine to medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; common very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.4); clear wavy boundary. 12 to 20 inches thick.

B1--22 to 30 inches, brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine roots; common very fine tubular pores; 20 percent gravel; neutral (pH 7.2); clear wavy boundary. 6 to 12 inches thick.

B21--30 to 37 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine tubular and interstitial pores; 40 percent gravel, 5 percent cobbles; neutral (pH 7.1); clear wavy boundary. 6 to 15 inches thick.

B22--37 to 58 inches, yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine interstitial pores; 40 percent gravel, 20 percent cobbles; neutral (pH 6.8).

These soils are noneffervescent throughout and slightly acid or neutral in reaction. The mean annual soil temperature ranges from 42° to 47° F., and the mean summer soil temperature is 59° to 64° F. The B horizons have hue of 10YR, value of 5 or 6 dry and 3 or 4 moist, and chroma of 3 or 4. Textures of the control section are dominantly silt loam but range to include loam or very fine sandy loam. The weighted average of coarse fragments ranges from 15 to 30 percent.

Iver soils have been mapped only in Pernty-Iver association, steep (61), and Pernty-Iver association, very steep (62).

McConnel Series

The McConnel series are deep, somewhat excessively drained soils. They developed in loamy alluvium deposited over sands and gravels. The parent materials formed from mixed rocks including volcanic ash on off-shore lake bars, embankments and alluvial fans. Slopes range from 0 to 30 percent. They occur at elevations of 4,200 to 4,800 feet. The mean annual precipitation is 7 to 10 inches, mean annual air temperature is 49° to 51° F., and the frost-free season is 100 to 120 days. The native vegetation is mostly big sagebrush, squirreltail, and annual grasses and forbs.

Typical McConnel soil profiles have two main parts: (1) pale brown fine sandy loam about 16 inches thick; and (2) very pale brown and pale yellow stratified very gravelly sandy loam, very gravelly sand and gravels extending to 60 inches.

McConnel soils have moderately rapid permeability through the subsoil and very rapid through the underlying gravel. Effective depth is more than 60 inches. Available water capacity is moderately low to moderately high. Runoff is very slow to rapid depending upon slope, and the erosion hazard is slight to high.

A representative profile of McConnel fine sandy loam is in an area of Humboldt County, Nevada approximately 6 miles south of Winnemucca; about 1,600 feet north and 900 feet west of the northeast corner of section 30, T. 35 N., R. 38 E.

A11--0 to 4 inches, pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, friable, nonsticky, nonplastic; common very fine roots; many very fine and fine interstitial pores; mildly alkaline (pH 7.4); clear smooth boundary. 2 to 4 inches thick.

A12--4 to 8 inches, pale brown (10YR 6/3) gravelly fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine and few medium roots; many very fine interstitial pores; 30 percent gravel; mildly alkaline (pH 7.4); abrupt smooth boundary. 2 to 6 inches thick.

C1--8 to 16 inches, pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky, nonplastic; common very fine roots; few very fine tubular pores; mildly alkaline (pH 7.6); abrupt wavy boundary. 6 to 10 inches thick.

IIC2ca--16 to 30 inches, very pale brown (10YR 7/3) very gravelly coarse sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 60 percent gravel; strongly effervescent; strongly alkaline (pH 9.0); abrupt wavy boundary. 10 to 30 inches thick.

IIC3ca--30 to 40 inches, very pale brown (10YR 5/3) very gravelly fine sandy loam; yellowish brown (10YR 5/4) moist; massive; soft, friable, nonsticky, nonplastic; few very fine roots; few very fine interstitial and tubular pores; 45 percent gravel; violently effervescent; very strongly alkaline (pH 9.2); abrupt wavy boundary. 0 to 16 inches thick.

IIIC4ca--40 to 46 inches, pale yellow (2.5Y 7/4) very gravelly sand, light olive brown (2.5Y 5/4) moist; single grained; loose, nonsticky, nonplastic; few very fine roots; many very fine interstitial pores; 60 percent gravel; violently effervescent; very strongly alkaline (pH 9.2); abrupt wavy boundary. 0 to 10 inches thick.

IVC5ca--46 to 60 inches, pale yellow (2.5Y 7/4) gravelly fine sandy loam, light olive brown (2.5Y 5/4) moist; massive; hard, friable, nonsticky, nonplastic; few very fine roots; common very fine interstitial pores; 25 percent gravel; strongly effervescent; strongly alkaline (pH 8.8).

Thickness of the solum and depth to the unconformable underlying gravel ranges from 10 to about 20 inches. Texture of the 10 to 40 inch control section averages loamy coarse sand, coarse sand, loamy sand or sand. The average gravel content is 60 to 80 percent. The solum is noneffervescent and the reaction ranges from neutral to mildly alkaline. In some areas the A horizon in some profiles contain 15 to 35 percent cobbles and a few stones. The C horizons are weakly to violently effervescent with lime coatings on pebbles, and reaction ranges from moderately alkaline to very strongly alkaline.

McConnel fine sandy loam, 0 to 2 percent slopes (46).--This soil occurs as large, smooth areas on off-shore lake bars, embankments and alluvial fans. The soil has the profile described as representative for the soil series. Included in delineated areas of this soil are about 10 to 15 percent Orovada and Rebel soils.

Runoff is very slow and the erosion hazard is slight.

This soil is suited for irrigated cropland. It is used principally for rangeland and wildlife habitat. A few areas have been converted to cropland. Irrigation water is pumped from deep wells. The principal crops are alfalfa and small grains.

Land capability unit IIIs-45, irrigated; VIc-220, dryland

Range site NV-24-20 Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 2-4-I, irrigated; --42, dryland.

McConnel gravelly fine sandy loam, 4 to 8 percent slopes (47).--This soil occurs as narrow, elongated, fan-shaped areas on alluvial fans. The soil is similar to that described for the soil series except it has 15 to 30 percent gravel in the upper layers and 4 to 8 percent slopes. Included are about 10 to 15 percent Bliss and Orovada soils.

Runoff is moderately rapid to rapid and the erosion hazard is moderate to high.

This soil is poorly suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit IVe-25, irrigated; VIc-220, dryland

Range site Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 2-4-I, irrigated; --42, dryland.

McConnel cobbly sandy loam, 15 to 30 percent slopes (48).--This soil occurs as long, narrow areas on the lower peripheries of alluvial fans where the fans break into moderately steep escarpments. The soil is similar to that described for the soil series except it has cobbles on the surface and throughout the profile; sandy loam surface texture and slopes of 15 to 30 percent. Included are about 15 percent Bliss and Weso soils, and other kinds of McConnel soils.

Runoff is rapid, and the erosion hazard is high.

This soil is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit VIs-236, dryland

Range site NV-24-20, Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 2-4-I, irrigated; --42, dryland.

Mullyon Series

The Mullyon series consists of well drained soils. They formed in residual material from dolomite and limestone. Slopes are 50 to 70 percent. They occur at elevations of 5,400 to 6,000 feet where the mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is big sagebrush, juniper, Sandberg bluegrass, Indian ricegrass, cheatgrass, squirreltail, rabbitbrush, buckwheat, astragalas, Indian paintbrush and phlox.

Typical Mullyon soil profiles have three main parts: (1) a surface layer of light brownish gray stony silt loam about 8 inches thick; (2) yellowish brown silt loam about 5 inches thick; and (3) fractured dolomite bedrock.

The Mullyon soils are moderately permeable. Effective depth is 12 to 20 inches. Available water capacity is low. Runoff is rapid to very rapid and the erosion hazard is high.

A representative profile of Mullyon stony silt loam is in an area of Pershing County, Nevada approximately 8 miles southeast of Winnemucca, at a site 1,300 feet east of the center of section 2, T. 34 N., R. 38 E. The surface is covered with 35 percent gravel, about 3 percent stones, and 30 to 40 percent rock outcrops.

A11--0 to 3 inches, light brownish gray (10YR 6/2) stony silt loam, dark grayish brown (10YR 4/2) moist; moderate very fine platy structure; soft, very friable, slightly sticky, slightly plastic; very few very fine roots; many very fine interstitial pores; 20 percent gravel; very slightly effervescent; moderately alkaline (pH 8.4); clear wavy boundary. 2 to 5 inches thick.

A12--3 to 8 inches, light brownish gray (10YR 6/2) gravelly silt loam, dark grayish brown (10YR 4/2) moist; weak very fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine interstitial pores; 20 percent gravel; very slightly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 5 to 8 inches thick.

B2--8 to 13 inches, yellowish brown (10YR 5/4) silt loam, dark brown (10YR 4/3) moist; weak very fine angular blocky structure; soft, friable, slightly sticky, slightly plastic; common fine and very fine roots; many very fine interstitial pores; 10 percent gravels that have some thin lime coats on undersides; few patchy clay films; very slightly effervescent in matrix, effervescent and strongly effervescent under rock fragments; strongly alkaline (pH 8.8); abrupt irregular boundary. 5 to 8 inches thick.

R--13 to 15 inches, fractured dolomite bedrock.

Thickness of solum and depth to bedrock range from 12 to 20 inches. The profile may be noncalcareous in the surface, but is usually at least very slightly effervescent throughout, and the reaction ranges from moderately alkaline to very strongly alkaline. Thickness of the A horizon ranges from 6 to 10 inches and is usually silt loam, but may include loam. Gravel content in the A horizons is 15 to 30 percent. The B2 horizon is usually silt loam but may include some sandy loam or loam. It has 10 to 20 percent gravel.

Mullyon-Rock outcrop complex (49).--This complex occurs in irregularly shaped areas on steep and very steep convex upland hillsides where parent rock is dolomite and limestone. It consists of 55 percent Mullyon stony silt loam, 50 to 70 percent slopes, and 30 percent Rock outcrop. The Mullyon soil is on the steep and very steep convex upland hillsides. It has the profile described as representative for the series. The Rock outcrop is interspersed with the soil in scattered outcrop throughout the area.

The native plant cover for the Mullyon soils is similar to that for the series. The Rock outcrop is essentially barren. Runoff is rapid and the erosion hazard is high for the Mullyon soil.

This complex is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit VIIs-237, dryland.

Mullyon component: Range site NV-24-19, Semidesert juniper savannah

Wildlife suitability group --44, dryland.

Needle Peak Series

The Needle Peak series consists of deep, moderately well drained soils formed in alluvium with intermixed loess, and reworked lake sediments weathered from a variety of rocks including quartzite, sandstone, chert, rhyolite, shale, limestone, dolomite, slate, basalt, andesite and volcanic ash. They are on nearly level, smooth or slightly concave alluvial fans, terraces and flood plains at elevations of 4,000 to 5,000 feet. Slopes are less than 1 percent. The mean annual precipitation is 7 to 9 inches, mean annual air temperature is 45° to 48° F., and the frost-free season is 100 to 120 days. The native vegetation is big sagebrush, rubber rabbitbrush, greasewood, Great Basin wildrye, squirreltail and cheatgrass.

Typical Needle Peak soil profile have two main parts: (1) a light brownish gray silt loam about 11 inches thick; (2) light gray, calcareous silt loam that extends to more than 60 inches.

Needle Peak soils have moderately slow permeability. Effective depth is more than 60 inches. Available water capacity is high. Runoff is very slow. In the spring, these soils receive runoff of drainage water from other areas. The erosion hazard is slight.

A representative profile of Needle Peak silt loam, slightly saline is in an area of Humboldt County, Nevada approximately 8.5 miles southwest of Winnemucca, about 500 feet south and 100 feet east of the north quarter corner of section 35, T. 35 N., R. 37 E.

All--0 to 4 inches, light brownish gray (2.5Y 6/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; moderate fine platy that breaks easily to weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very

fine and medium roots; many very fine and fine interstitial pores and few fine vesicles; moderately alkaline (pH 8.2); abrupt smooth boundary. 3 to 6 inches thick.

C1--4 to 11 inches thick, light gray (10YR 7/2) silt loam, brown (10YR 4/3) moist; dark grayish brown (10YR 4/2) moist and crushed; massive; hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; moderately alkaline (pH 8.4); clear smooth boundary. 6 to 9 inches thick.

C2ca--11 to 21 inches, light gray (10YR 7/2) silt loam, brown (10YR 4/3) moist; dark grayish brown (10YR 4/2) moist and crushed; common fine distinct white (10YR 8/1) lime filaments and mottles; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common very fine and few fine roots; common very fine and fine tubular pores; strongly effervescent; strongly alkaline pH 8.8; clear smooth boundary. 8 to 12 inches thick.

C3ca--21 to 41 inches, light brownish gray (2.5Y 6/2) heavy silt loam, light olive brown (2.5Y 5/3) moist; few fine faint mottles of strong brown (10YR 5/4) moist; weak medium and fine subangular blocky structure; hard, friable, sticky, plastic; few fine and very fine roots; many very fine and fine tubular pores; few thin siliceous films in pores; many fine white (2.5Y 8/1) lime filaments and flecks; strongly efervescent; strongly alkaline (pH 8.9); clear smooth boundary. 16 to 24 inches thick.

IIC4ca--41 to 52 inches, white (2.5Y 8/2) silt loam, light grayish brown (2.5Y 6/2) moist; many fine prominent mottles, strong brown (7.5YR 5/6); weak medium platy material that parts readily to moderate fine subangular blocky structure; hard, friable, sticky, plastic; few very fine and fine roots; common very fine and fine roots; common very fine and fine tubular and interstitial pores; few crustacean shells; many fine faint white (2.5Y 8/1) lime filaments; strongly effervescent; very strongly alkaline (pH 9.2); abrupt smooth boundary. 6 to 14 inches thick.

IIC5--52 to 65 inches, light gray (2.5Y 7/2) silt loam, grayish brown (2.5Y 5/2) moist; common medium prominent mottles, strong brown (7.5YR 5/6); weak thick platy material

that parts readily to strong coarse and medium angular blocky structure; very hard, firm, sticky, plastic; few very fine and fine roots; few fine and very fine tubular, and many very fine and fine interstitial pores; common crustacean shells; strongly effervescent; strongly alkaline (pH 9.0).

The depth to lime ranges from 6 to 12 inches. The 10 to 40 inch control section is silt loam or silty clay loam with an average clay content of 20 to 35 percent. The A1 horizon is moderately alkaline. The C horizons are calcareous and reaction is moderately to very strongly alkaline.

Needle Peak silt loam, slightly saline-alkali (50).--This soil occurs as relatively smooth, irregular-shaped areas on nearly level, slightly concave terraces below alluvial fans. The soil has the profile described as representative for the soil series. It is slightly saline-alkali affected. Included are about 10 to 15 percent strongly saline-alkali Needle Peak soils, and some Benin, Dun Glen Raglan and Prida soils.

This soil is subject to rare flooding.

This soil is well suited for irrigated cropland. It is used principally for rangeland and wildlife habitat. A few areas are used as cropland with irrigation water provided by pumping from deep wells.

Land capability unit IIs-46, irrigated; VIs-221, dryland

Range site NV-24-6 Dry flood plain

Wildlife suitability group 1-3-I, irrigated; --33, dryland.

Needle Peak silt loam, strongly saline-alkali (51).--This soil occurs as relatively smooth, irregular-shaped areas on nearly level, slightly concave terraces and alluvial fans. This soil is similar to that described for the soil series except it has silty clay loam textures in the subsoil and substratum, and it is strongly saline-alkali. Included are about 10 to 15 percent slightly saline-alkali Needle Peak soils, and some Raglan and Prida soils.

The native vegetation is primarily greasewood and Great Basin wildrye. Available water capacity is high. This soil is subject to rare flooding.

This soil is suited for irrigated cropland if it is drained and reclaimed. It is used principally for rangeland and wildlife habitat.

Land capability unit IIIw-61, irrigated; VIIs-221, dryland

Range site NV-24-7 Saline bottom

Wildlife suitability group 2-3-I, irrigated; --34, dryland.

Nevtah Series

The Nevtah series are moderately deep, well drained soils formed in residuum from weathered quartzite and chert. They are on mountain hillsides and foothills at elevations of 7,000 to 9,000 feet. Slopes are 4 to 30 percent. The mean annual precipitation is 14 to 20 inches, mean annual air temperature is 36° to 45° F., and the frost-free season is less than 60 days. The native vegetation is principally big sagebrush, snowberry, wild currant, elderberry, rabbitbrush, lupine, and bluebunch wheatgrass.

Typical Nevtah soil profiles have three main parts: (1) a grayish brown stony silt loam about 20 inches thick; (2) pale brown gravelly loam about 16 inches thick; and (3) hard bedrock.

Nevtah soils are moderately permeable. Effective depth is 20 to 40 inches. Available water capacity is moderately low to moderately high. Runoff is slow to medium depending on slope. The erosion hazard is moderate to high.

A representative profile of Nevtah stony silt loam is in an area of Humboldt County, Nevada approximately 11 miles southeast of Winnemucca, and 2 miles southwest of Sonoma Peak, about 600 feet south and 800 feet east of the west quarter corner of section 8, T. 34 N., R. 39 E.

A11--0 to 4 inches, grayish brown (10YR 5/2) stony silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 20 percent gravel, 1 to 2 percent stones; neutral (pH 6.8); abrupt wavy boundary. 3 to 5 inches thick.

A12--4 to 9 inches, grayish brown (10YR 5/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, nonsticky, nonplastic; common very fine roots; many very fine interstitial pores; 20 percent gravel; neutral (pH 6.8); clear wavy boundary. 4 to 6 inches thick.

A13--9 to 20 inches, grayish brown (10YR 5/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; many very fine interstitial pores; 25 percent gravel, 5 percent cobbles and stones; neutral (pH 6.8); abrupt wavy boundary. 9 to 12 inches thick.

C1--20 to 26 inches, pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, friable, nonsticky, nonplastic; few very fine and fine roots; few very fine tubular pores; 35 percent gravel, 5 percent cobbles; neutral (pH 6.8); clear wavy boundary. 3 to 7 inches thick.

C2--26 to 36 inches, pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; massive; hard, friable, nonsticky, nonplastic; few very fine and fine roots; few very fine tubular pores; 40 percent gravel, 5 percent cobbles; neutral (pH 6.8); abrupt wavy boundary. 5 to 10 inches thick.

R--36 inches, quartzite and chert bedrock.

Depth to bedrock ranges from 20 to 40 inches. The section from 10 inches to bedrock is usually gravelly loam or gravelly silt loam. Strata of gravelly sandy loam or gravelly fine sandy loam are found in some profiles. The average clay content is 12 to 18 percent and there are 35 to 50 percent coarse fragments.

Nevtah stony silt loam, 15 to 30 percent slopes (52).--This soil occurs as rounded, rectangular shaped areas on mountain slopes. It has the profile described as representative for the soil series. Included are about 10 to 15 percent Dryn, Harcany, Panin, and Winevada soils.

This soil is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit VIs-211, dryland

Range site NV-24-27 High mountain loam

Wildlife suitability group --42, dryland.

Ninch Series

The Ninch series are deep, somewhat excessively drained, sandy soils formed in sandy wind-worked materials containing some volcanic ash. They are on undulating or hummocky, partially stabilized, low dunes deposited on nearly level to gently sloping terraces and alluvial fans. Slopes are 0 to 15 percent. Elevation ranges from 3,800 to 5,000 feet. The average annual precipitation is 8 to 10 inches, mean annual air temperature is 47° to 52° F., and the frost-free season is 100 to 120 days. The vegetation is big sagebrush, rabbitbrush, greasewood, Indian ricegrass, needleandthread grass, saltgrass, western wheatgrass, scurfpea and various annuals.

Typical Ninch soil profiles have three main parts: (1) light brownish gray fine sand about 25 inches thick; (2) light brownish gray fine sand about 10 inche thick; and (3) light gray and light brownish gray stratified fine sandy loam and very fine sandy loam extending to 70 inches.

The Ninch soils have moderately rapid permeability. Effective depth is over 60 inches. Available water capacity is moderately high to high. Runoff is very slow. The erosion hazard by wind is high.

A representative profile of Ninch fine sand is in an area of Humboldt County, Nevada approximately 2 1/2 miles northwest of the Winnemucca Airport, about 600 feet south and 300 feet east of the north quarter corner of section 20, T. 36 N., R. 38 E.

A1--0 to 6 inches, light brownish gray (10YR 6/2) slightly micaceous fine sand, dark grayish brown (10YR 4/2) moist; single grained; loose; many very fine and fine

roots; many very fine interstitial pores; neutral (pH 7.0); clear smooth boundary. 4 to 7 inches thick.

C1--6 to 25 inches, light brownish gray (2.5Y 6/2) fine sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, many very fine roots and few saltgrass rhizomes; many very fine interstitial pores; neutral (pH 7.2); clear wavy boundary. 14 to 22 inches thick.

C2si--25 to 35 inches, light brownish gray (2.5Y 6/2) heavy loamy fine sand, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, many very fine and fine roots; common very fine and fine tubular, and many very fine interstitial pores; contain about 25 percent 1/4 to 1/2 inch, very hard, firm durinodes; mildly alkaline (pH 7.8); clear wavy boundary. 8 to 14 inches thick.

C3sica--35 to 41 inches, light brownish gray (2.5Y 6/2) light fine sandy loam, dark grayish brown (2.5Y 4/2) moist; hard, friable, nonsticky, nonplastic; many very fine and few fine roots; many very fine, and few fine tubular, and many micro interstitial pores; contains about 25 percent 1/4 to 3/4 inch durinodes that are hard and firm; few thin silica coatings in pores and as laminae; slightly effervescent, but where few fine to medium white (10YR 8/2) lime coatings occur on silica laminae it is strongly effervescent; strongly alkaline (pH 8.8); clear wavy boundary. 5 to 10 inches thick.

IIC4sica--41 to 70 inches, light gray (2.5Y 7/2) with pockets and seams of light brownish gray (2.5Y 6/2) weakly silica-cemented very fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; very hard, firm, brittle; few very fine and fine roots; few fine, and many very fine tubular pores; common thin silica films in pores and as discontinuous laminae; lime coatings on silica laminae and in pores; strongly effervescent; very strongly alkaline (pH 9.6).

Thickness of the A1 horizon ranges from 7 to 10 inches. The A1 horizon is single grained in the upper few inches and massive below. Texture of the 10 to 40 inch control section is dominantly fine sand stratified with loamy fine sand, but may include strata

of sand or loamy sand. Thin strata of fine sandy loam or sandy loam also occur. Depth to the Csi horizons ranges from 18 to 36 inches. They contain from 20 to 60 percent hard to very hard, and firm to very firm durinodes. Weakly cemented hardpans are found below 40 inches in some places. The profiles are noncalcareous below those depths. Silica and lime filaments and coatings may be present in the Csi horizons. Unconformable very fine sandy loam, loam, or silt loam may be present below 40 inches.

Ninch fine sand, 0 to 15 percent slopes (53).--This soil occurs as rounded and elongated, partially stabilized dunes on nearly level to gently sloping terraces and alluvial fan toe slopes. This soil has the profile described as representative for the soil series. Included are about 15 percent Goldrun and Valmy soils.

This soil is suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit IVs-43, irrigated; VIIs-224, dryland

Range site NV-24-17 Semidesert sandy

Wildlife suitability group 3-4-I, irrigated; --42, dryland

Nomara Series

The Nomara series consists of well drained soils. They formed in residual material from dark siliceous argillite and slate, altered andesite lava, limestone, and quartzite. Slopes are 40 to 70 percent. They occur at elevations of 5,500 to 7,000 feet where the mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days.

Typical Nomara soil profiles have three main parts: (1) a surface layer of grayish brown stony silt loam about 19 inches thick; (2) brown gravelly clay loam about 21 inches thick; and (3) weathered bedrock.

Nomara soils have slow permeability. Effective depth is 20 to 40 inches. Available water capacity is moderately low to moderately high. Runoff is very rapid and the erosion hazard is high.

A representative profile of Nomara stony silt loam is in an area of Humboldt County, Nevada approximately 4 miles southeast to Winnemucca, about 1,600 feet north and 2,400 feet east of the southwest corner of section 12, T. 35 N., R. 38 E. The surface is covered with about 4 percent gravel, 3 percent cobbles, and 1 percent stones.

A11--0 to 4 inches, dark grayish brown (10YR 4/2) stony silt loam, very dark brown (10YR 2/2) moist; weak very fine platy structure; slightly hard, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 5 percent gravel, 3 percent stones, 1 percent stones; neutral (pH 7.0); abrupt wavy boundary. 2 to 4 inches thick.

A12--4 to 10 inches, grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common very

fine roots; many very fine interstitial pores; 5 percent gravel; neutral (pH 7.2); clear wavy boundary. 3 to 6 inches thick.

A13--10 to 19 inches, brown (10YR 5/2) silt loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine interstitial pores; 10 percent gravel, 5 percent cobbles; mildly alkaline (pH 7.4); abrupt wavy boundary. 4 to 9 inches thick.

B21t--19 to 34 inches, brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak very fine subangular blocky structure; very hard, friable, sticky, plastic; few very fine roots; few very fine interstitial and tubular pores; few thin clay films on ped faces and in pores; 40 percent gravel; mildly alkaline (pH 7.6); abrupt wavy boundary. 8 to 15 inches thick.

B22t--34 to 40 inches, brown (10YR 5/3) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist with many medium distinct white (10YR 8/2) lime mottles; massive; very hard, friable, very sticky, very plastic; few very fine roots; few very fine tubular pores; common thin clay films in pores; 60 percent gravel, 20 percent cobbles; violently effervescent; strongly alkaline (pH 8.8); abrupt irregular boundary. 3 to 6 inches thick.

C1--40 to 45 inches, light yellowish brown (10YR 6/4) weathered fractured bedrock, dark yellowish brown (10YR 4/4) moist; lime coating on rock fragments and in cracks.

Thickness of the solum and depth to the weathered bedrock ranges from 20 to 40 inches. The mean annual soil temperature ranges from 40° to 45° F., and the mean summer soil temperature is 55° to 60° F. The A1 horizons are noneffervescent and neutral in reaction. The B2t has hue of 10YR, value of 4 or 5 dry and 2, 3, or 4 moist, and chroma of 3 or 4. Texture is silt loam, loam or clay loam with a weighted average clay content ranging from 20 to 35 percent. There are 40 to 80 percent coarse fragments. The C horizons and, in some profiles, the lower part of the B2t horizons below about 30 inch depth are effervescent and moderately to strongly alkaline in reaction.

Nomara-Gosumi association (54).--This association occurs on steep upland slopes. It consists of about 50 percent Nomara stony silt loam, 50 to 70 percent slopes, and 35 percent Gosumi stony loam, 30 to 50 percent slopes. Nomara soils are on north facing slopes, and the Gosumi soils are on west and south slopes. These soils have the profiles described as representative for their respective series. Included are about 15 percent Pernty, Golsum and Iver soils, and other Gosumi soils.

Vegetation on Nomara soils consists of big sagebrush, rabbitbrush, snowberry, elderberry, Idaho fescue, lupine and astragalas, and on Gosumi soils it is low sagebrush, big sagebrush, Idaho fescue, lupine and phlox. The Nomara soils have slow permeability, and on Gosumi soils it is very slow. These soils have moderately low to moderately high available water capacity. Nomara soils have very rapid runoff and for Gosumi soils it is rapid. These soils have a high erosion hazard.

This association is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Nomara component: Land capability unit VIIs-239, dryland

Range site NV-24-23 Upland north slopes

Wildlife suitability group --41, dryland.

Gosumi component: Land capability unit VIIs-239, dryland

Range site NV-24-18 Semidesert claypan

Wildlife suitability group --43, dryland.

Orovada Series

The Orovada series consists of very deep, well drained, loamy soils. They formed in alluvium and loess from mixed sources including both igneous and metamorphic rocks and some volcanic ash. They are on smooth to very gently convex, nearly level to strongly sloping alluvial fans with slopes of 0 to 15 percent. The elevation is 4,100 feet to 6,000 feet. The mean annual precipitation is 6 to 10 inches, mean annual temperature is 43° to 47° F., and the frost-free season is 100 to 130 days. The vegetation is principally big sagebrush, rabbitbrush, cheatgrass, squirreltail and Sandberg bluegrass.

Typical Orovada soil profiles have three main parts: (1) pale brown loam about 11 inches thick; (2) light yellowish brown loam about 14 inches thick; and (3) very pale brown stratifed very fine sandy loam and silt loam which extends to 60 inches.

Orovada soils have moderate permeability. Effective depth is more than 60 inches. Available water capacity is high. Runoff is slow to medium, and the erosion hazard is slight to moderate depending on slope.

A representative profile of Orovada loam is in an area of Humboldt County, Nevada approximately 6 miles southwest of Winnemucca, about 500 feet north of the south quarter corner of section 23, T. 35 N., R. 37 E.

A11--0 to 1 inch, pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate thick platy structure; slightly hard, friable, nonsticky, nonplastic; few very fine roots; many fine and medium vesicular pores; mildly alkaline (pH 7.6); abrupt smooth boundary. 1 to 3 inches thick.

A12--1 to 4 inches, pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak thick platy structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many very fine interstitial pores; mildly alkaline (pH 7.8); abrupt smooth boundary. 3 to 5 inches thick.

B2--4 to 11 inches, light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; weak fine to medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine, common fine and few medium roots; many very fine interstitial and few very fine and fine tubular pores; mildly alkaline (pH 7.8); clear smooth boundary. 6 to 10 inches thick.

C1ca--11 to 25 inches, light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; massive; hard, friable, nonsticky, nonplastic; common very fine, few fine and medium roots; common very fine interstitial and few fine tubular pores; slightly effervescent in matrix with strongly effervescent spots; strongly alkaline (pH 8.6); abrupt smooth boundary. 8 to 16 inches thick.

C2si--25 to 38 inches, pale yellow (2.5Y 7/4) very fine sandy loam, light olive brown (2.5Y 5/4) moist; massive; very hard, firm, nonsticky, nonplastic; few very fine and fine roots; few very fine and fine tubular pores; about 50 percent durinodes; slightly effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary. 10 to 16 inches thick.

C3--38 to 60 inches, very pale brown (10YR 8/3) silt loam with a high content of volcanic ash, very pale brown (10YR 7/3) moist; massive; hard, friable, nonsticky, nonplastic; few very fine roots; few very fine and fine tubular pores; slightly effervescent; neutral (pH 7.0).

Thickness of the solum is 10 to 18 inches. The solum is free of lime and ranges from neutral to mildly alkaline in reaction. Depth to lime ranges from 10 to 18 inches. The 10 to 40 inch control section is stratified loam, silt loam, very fine sandy loam and fine sandy loam. The clay content averages 5 to 12 percent. Gravel content ranges from 0 to 30 percent. In some profiles the soil is underlain by gravel below 40 inches.

Orovada loam, 0 to 2 percent slopes (56).--This soil occurs as large, fan-shaped or oval areas on alluvial fans with slopes of 0 to 2 percent. It has the profile described as representative for the series. Included are about 15 percent Adelaide, Dun Glen, McConnel, and Rebel soils.

This soil is used for irrigated cropland as well as range for livestock. If water is available for irrigation, it is well suited for use as cropland. The principal crops grown are alfalfa and small grains.

Land capability unit IIc-1, irrigated; VIc-220, dryland

Range site NV-24-20 Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 1-3-I, irrigated; --42, dryland

Orovada gravelly loam, 0 to 2 percent slopes (58).--This soil occurs as large, fan-shaped or oval areas on alluvial fans with slopes of 0 to 2 percent. It has a profile similar to that described for the series except it has a gravelly loam surface texture and 15 to 30 percent gravel in the profile. Included are about 15 percent Adelaide, Dun Glen, McConnel and Rebel soils, and other Orovada soils with less than 15 percent gravel content.

This soil is used for irrigated cropland and as range for livestock. If water is available for irrigation it is suited for use as cropland. The principal crops grown are alfalfa and small grains.

Land capability unit IIc-1, irrigated; VIc-220, dryland

Range site NV-24-20 Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 1-3-I, irrigated; --42, dryland

Orovada gravelly loam, 2 to 4 percent slopes (59).--This soil occurs as large, fan-shaped or oval areas on alluvial fans. It has a profile that is similar to that described for the series except it has a gravelly loam surface texture and slopes of 2 to 4 percent. Included are 15 percent Adelaide, Dun Glen, McConnel and Rebel soils, and other Orovada soils.

This soil is used principally as range for livestock. If water is available for irrigation it is suited for crop production.

Land capability unit IIe-20, irrigated; VIc-220, dryland

Range site NV-24-20 Droughty loam, 8 to 10 inch precipitation zone

Panin Series

The Panin series consists of well drained soils formed in residuum and colluvium weathered from rhyolite, quartzite and chert. Slopes are 8 to 30 percent. The elevation ranges from 7,000 to 9,000 feet where the mean annual precipitation is 12 to 15 inches, mean annual air temperature is 35° to 40° F., and the frost-free season is 50 to 70 days. Vegetation is principally big sagebrush, rabbitbrush, snowberry, lupine, arrowleaf balsamroot, hawksbeard, thistle, buckwheat, squirreltail, Sandberg bluegrass, bluebunch wheatgrass and Idaho fescue.

Typical Panin soil profiles have three main parts: (1) a surface layer of dark grayish brown stony loam about 8 inche thick; (2) brown and pale brown very stony clay loam about 14 inches thick; and (3) rhyolite bedrock.

The Panin soils have slow permeability. Effective depth is 20 to 36 inches. Available water capacity is low to moderately low. Runoff is medium to rapid, and the erosion hazard is moderate to high.

A representative profile of Panin stony loam is in an area of Pershing County, Nevada approximately 18 miles southeast of Winnemucca in the Sonoma Range, about 2,100 feet north and 200 feet east of the southwest corner of section 2, T. 33 N., R. 39 E. The surface is covered with about 2 percent stones.

A11--0 to 4 inches, dark grayish brown (10YR 4/2 stony loam, very dark brown (10YR 2/2) moist weak very thin platy structure; soft, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 2 percent stones; neutral (pH 6.6); clear wavy boundary. 3 to 5 inches thick.

A12--4 to 8 inches, grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and few fine, medium and large roots; many very fine interstitial pores; neutral (pH 6.6); abrupt wavy boundary. 4 to 6 inches thick.

B21t--8 to 17 inches, brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine angular blocky structure; very hard, firm, sticky, plastic; common very fine and few fine and medium roots; few very fine interstitial and few fine tubular pores; common thin clay films on ped faces and in pores; 25 percent gravel; neutral (pH 6.6); clear wavy boundary. 8 to 15 inches thick.

B22t--17 to 22 inches, pale brown (10YR 6/3) extremely stony clay loam, brown (10YR 4/3) moist; moderate fine angular blocky structure; very hard, firm, sticky, plastic; few very fine and fine roots; few very fine interstitial and tubular pores; common thin clay films on ped faces and in pores; 35 percent stones, 25 percent gravel; neutral (pH 6.6); clear irregular boundary. 5 to 10 inches thick.

R--22 to 38 inches, weathered fractured rhyolite bedrock with clay in cracks and pockets in the bedrock.

Thickness of the solum and depth to bedrock ranges from 20 to 36 inches. The A1 horizon has chroma of 2 or 3. The B2 horizon has chroma of 3 or 4. The average clay content of the B2 horizon is 28 to 35 percent and it has coarse fragments consisting of 15 to 20 percent gravel and 20 to 30 percent stones and cobbles.

Panin soils have been mapped only Spinlin-Panin association, sloping (83), and Spinlin-Panin association, moderately steep (84).

Percoun Series

The Percoun series consists of well drained soils. They formed in residual material and colluvium from argillite, slate, andesite, and quartzite. Slopes are 50 to 70 percent. They occur at elevations of 6,500 to 8,000 feet where the mean annual precipitation is 12 to 15 inches, mean annual air temperature is 35° to 40° F., and the frost-free season is 50 to 80 days. Vegetation is big sagebrush, rabbitbrush, currant, elderberry, juniper, bluebunch wheatgrass, Nevada bluegrass, cheatgrass, balsamroot, wyethia, and lupine.

Typical Percoun soil profiles have three main parts: (1) a surface layer of grayish brown extremely stony loam about 13 inches thick; (2) brown or yellowish brown very gravelly silty clay about 18 inches thick; and (3) weathered bedrock.

Percoun soils have very slow permeability. Effective depth is 20 to 40 inches. Available water capacity is low to moderately low. Runoff is very rapid, and the erosion hazard is high.

A representative profile of Percoun extremely stony silt loam is in an area of Humboldt County, Nevada approximately 6 miles southeast of Winnemucca, about 1,600 feet west and 1,800 feet south of the northeast corner of section 13, T. 35 N., R. 38 E. The surface is covered by 5 to 10 percent gravel, 7 to 10 percent cobbles, 7 to 10 percent stones, 1 to 3 percent boulders, and 1 to 2 percent rock outcrops.

A11--0 to 4 inches, grayish brown (10YR 5/2) extremely stony silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 25 percent gravel; neutral (pH 6.6); abrupt wavy boundary. 3 to 6 inches thick.

A12--4 to 10 inches, grayish brown (10YR 5/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common very fine and few fine and medium roots; many very fine interstitial pores; 25 percent gravel; neutral (pH 6.8); clear wavy boundary. 4 to 8 inches thick.

A3--10 to 13 inches, brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak very fine subangular blocky structure; slightly plastic; common very fine and few fine, medium and large roots; common very fine interstitial and few very fine tubular pores; 25 percent gravel; neutral (pH 6.8); clear wavy boundary. 2 to 4 inches thick.

B21--13 to 22 inches, brown (10YR 5/3) very gravelly silty clay loam, dark brown (10YR 3/3) moist; weak very fine subangular blocky structure; very hard, friable, sticky, plastic; few very fine, fine, medium and large roots; few very fine interstitial and tubular pores; common thin clay films on ped faces and in pores; 40 percent gravel; neutral (pH 6.8); clear wavy boundary. 5 to 10 inches thick.

B22t--22 to 31 inches, yellowish brown (10YR 5/4) very gravelly silty clay, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; very hard, firm, very sticky, very plastic; few very fine, fine, medium and large roots; few very fine interstitial and tubular pores; 60 percent gravel; neutral (pH 6.6); abrupt wavy boundary. 6 to 12 inches thick.

R--31 to 36 inches, yellowish brown (10YR 5/4) lithic, fractured bedrock, dark yellowish brown (10YR 4/4) moist; clay coatings on rock fragments and deposits in cracks.

Thickness of the solum and depth to bedrock ranges from 20 to 40 inches. The soil is neutral in reaction and noncalcareous throughout. The mean annual soil temperature ranges from 36° to 41° F. The B2t horizon has hue of 10YR, value of 5 or 6 dry and 3 or 4 moist, and chroma of 3 or 4. The higher values and chromas are usually in the lower part. Texture of the B2t horizon is dominantly silty clay but ranges to include horizons of silty clay loam. The

weighted average clay content ranges from 35 to 55 percent and there are 40 to 60 percent coarse fragments. Structure is weak or moderate, very fine or fine subangular blocky.

Percoun-Rock outcrop association (60).--This association occurs in irregular-shaped areas on steep upland slopes. It consists of about 50 percent Percoun extremely stony silt loam, 50 to 70 percent slopes, and 25 percent Rock outcrop. Percoun soil is on northwest to northeast facing slopes. It has the profile described as representative for the soil series. The Rock outcrop is scattered throughout the delineated areas on slope breaks and ridges. Included are about 25 percent Harcany and Winevada soils, and other soils with thin, dark colored A1 horizons and clay B2t horizons.

The vegetation on Percoun soils consists of big sagebrush, rabbitbrush, gooseberry, elderberry, juniper, bluebunch wheatgrass, Nevada bluegrass, cheatgrass, balsamroot, wyethia and lupine. The Rock outcrop is essentially barren. Percoun soils have very slow permeability. They have low to moderately low available water capacity. Runoff is rapid, and the erosion hazard is high.

This association is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Percoun component: Land capability unit VIs-214, dryland

Range site NV-24-21 Upland loamy, 12 to 16 inch precipitation zone

Wildlife suitability group --42, dryland

Rock outcrop component: Land capability unit VIIIs

Pernty Series

The Pernty series consists of well drained soils. They formed in thin residual material and colluvium weathered from rhyolite, quartz, grit, sandstone and shale. Slopes are 50 to 70 percent. They occur at elevations of 5,500 to 7,000 feet where the mean annual precipitation is 10 to 12 inches, the mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. The vegetation is big sagebrush, rabbitbrush, juniper, Idaho fescue, mountain brome and phlox.

Typical Pernty soil profiles have three main parts: (1) a surface layer of brown very stony loam about 2 inches thick; (2) a brown gravelly and cobbly clay loam about 12 inches thick; and (3) weathered, fractured rhyolite bedrock.

Pernty soils have moderately slow permeability. Effective depth is 14 to 20 inches. Available water capacity is low. The runoff is very rapid, and the erosion hazard is high.

Representative profile of Pernty very stony loam is in an area of Humboldt County, Nevada approximately 5 miles southeast of Winnemucca at a site 1,800 feet south and 800 feet west of the northeast corner of section 15, T. 35 N., R. 38 E. The surface is covered by about 16 percent gravel, 3 percent cobbles, and 1 percent stones.

A1--0 to 2 inches, brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, slightly sticky, slightly plastic; common very fine roots; many very fine interstitial pores; 40 percent gravel; neutral (pH 7.0); clear smooth boundary. 2 to 4 inches thick.

B1t--2 to 6 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, very sticky, very plastic; many very fine roots; few very fine interstitial and common very fine tubular pores; many moderately thick clay films on ped faces and in pores; neutral (pH 7.0); abrupt wavy boundary. 4 to 6 inches thick.

B21t--6 to 10 inches, yellowish brown (10YR 5/4) gravelly clay loam, brown (10YR 4/3) moist; massive; hard, firm, very sticky, very plastic; common very fine and fine roots; common very fine interstitial and tubular pores; many moderately thick and few thick clay films bridging and coating sand and gravel fragments; 20 percent gravel, 10 percent cobbles; neutral (pH 7.0); abrupt irregular boundary. 4 to 6 inches thick.

B22t--10 to 14 inches, light yellowish brown (10YR 6/4) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine to medium subangular blocky structure; hard, friable, very sticky, very plastic; common very fine and medium roots; common very fine tubular pores; common thin clay films on ped faces and in pores; 60 percent cobbles; neutral (pH 7.0); abrupt irregular boundary. 4 to 6 inches thick.

R--14 to 18 inches, fractured rhyolite bedrock with many moderately thick and few thick clay coatings on rock fragments and deposits in cracks.

Thickness of the solum and depth to the bedrock ranges from 14 to 20 inches. The mean annual soil temperature ranges from 42° to 47° F., and the mean summer soil temperature is 59° to 64° F. These soils are noneffervescent and neutral in reaction. Coarse fragments range from 10 to 60 percent in different layers in the profile. The B2t horizon has hue of 10YR, value of 5 or 6 dry and 3 or 4 moist, and chroma of 3 or 4. Textures are principally clay loam or clay but range to include loam. The weighted average clay content ranges from 35 to 45 percent.

Pernty-Iver association, steep (61).--This association occurs on steep mountain slopes. It consists of about 55 percent Pernty very stony loam, 30 to 50 percent slopes, and 30 percent Iver stony silt loam, 30 to 50 percent slopes. These soils have the profiles described as representative for their respective soil series. The Pernty soils are on the west and south slopes and on ridges. Iver soils are on north slopes. Included are about 15 percent Golsum, Gosumi, Graley and Nomara soils.

The Pernty soils have a native plant cover consisting of big sagebrush, rabbitbrush, Idaho fescue, mountain brome and phlox. On Iver soils it is big sagebrush, rabbitbrush, low sagebrush, Idaho fescue and lupine. Pernty soils have very rapid runoff and on Iver it is rapid. The erosion hazard is high for these soils.

These soils are used principally for rangeland and wildlife habitat.

Pernty component: Land capability unit VIIs-237, dryland

Range site NV-24-13 Loamy, 10 to 12 inch precipitation zone

Wildlife suitability group --43, dryland

Iver component: Land capability unit VIe-220, dryland

Range site NV-24-23 Upland north slope

Wildlife suitability group --42, dryland

Pernty-Iver association, very steep (62).--This association occurs on very steep upland slopes. It consists of about 60 percent Pernty very stony loam, 50 to 70 percent slopes, and 25 percent Iver stony silt loam, 50 to 70 percent slopes. These soils have profiles that are similar to that described for the soil series except they are on steeper slopes. The Pernty soils are on west and south facing slopes and on ridges. Iver soils are on north slopes. Included are about 15 percent Golsum, Gosumi, Graley, and Nomara soils.

The Pernty soils have a native plant cover consisting of big sagebrush, rabbitbrush, juniper, Idaho fescue, mountain brome and phlox. The vegetation on Iver soils is big sagebrush, rabbitbrush, low sagebrush, Idaho fescue and lupine. The Pernty soils have very rapid runoff, and on Iver it is rapid. They have a high erosion hazard.

This association is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Pernty component: Land capability unit VIIs-237, dryland

Range site NV-24-19 Semidesert juniper savannah

Widlife suitability group --43, dryland

Iver component: Land capability unit VIIe-220, dryland

Range site NV-24-23 Upland north slope

Wildlife suitability group --42, dryland

Pocan Series

Pocan series consists of deep, well drained soils formed in colluvium and residuum from quartzite, slate, shale, sandstone, chert, and limestone. They are on steep mountainsides at elevations of 4,500 to 6,000 feet. Slopes are 30 to 50 percent. The mean annual precipitation is 8 to 10 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 120 days. The native vegetation is principally big sagebrush, rabbitbrush, Sandberg bluegrass, squirreltail, and phlox.

Typical Pocan soil profiles have three main parts: (1) pale brown stony loam about 10 inches thick; (2) yellowish brown gravelly loam about 38 inches thick; and (3) quartzite bedrock.

Pocan soils have slow permeability. Effective depth is 40 to 60 inches. Available water capacity is moderately high to high. Runoff is rapid, and the erosion hazard is high.

A representative profile for Pocan stony loam is in an area off Pershing County, Nevada approximately 25 miles southeast of Winnemuca about 1,000 feet south and 1,000 feet east of the northwest corner of section 28, T. 32 N., R. 39 E.

A11--0 to 3 inches, pale brown (10YR 6/3) stony loam, dark brown (10YR 3/3) moist; weak fine and moderate very fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine fibrous roots; many very fine interstitial pores; 1 percent stones; neutral (pH 7.2); clear smooth boundary. 2 to 6 inches thick.

A12--3 to 10 inches, pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; few fine and common very fine roots; many very fine interstitial pores; mildly alkaline (pH 7.4); clear smooth boundary. 5 to 11 inches thick.

B2--10 to 26 inches, yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 4/3) moist; moderate medium angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; common very fine tubular and interstitial pores; 15 percent fine gravel; mildly alkaline (pH 7.4); abrupt smooth boundary. 13 to 21 inches thick.

Cca--26 to 48 inches, light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and very fine roots; common very fine tubular and interstitial pores; 20 percent gravel; strongly effervescent; moderately alkaline (pH 8.4); abrupt irregular boundary. 20 to 25 inches thick.

R--48 to 50 inches, weathered quartzite bedrock.

Thickness of the solum and depth to free carbonates is 20 to 38 inches. Pocan soils are usually dry, mainly in the summer and fall, but are moist in the winter and spring. The solum is neutral or mildly alkaline. The 10 to 40 inch control section is loam or gravelly loam with thin strata of clay loam present in some profiles. The average clay content is 20 to 30 percent. The average content of gravel is 5 to 25 percent. The Cca horizons are strongly calcareous and moderately or strongly alkaline.

Pocan soils have been mapped only in Trunk-Pocan association (86).

Pocker Series

The Pocker series are deep, moderately well drained soils formed in clayey alluvium from mixed rocks including tuffs, basalt, andesite, shale, limestone and some volcanic ash. They are on smooth, nearly level, recent, low lying terraces and flood plains at elevations of 4,000 to 4,800 feet. Slopes are less than 1 percent. The mean annual precipitation is 6 to 8 inches, mean annual temperature is 46° to 50° F., and the frost-free season is 100 to 120 days. The native vegetation is greasewood, big sagebrush, big saltbush, rabbitbrush, saltgrass, Great Basin wildrye and cheatgrass.

Typical Pocker soil profiles have two main parts: (1) pale brown silty clay loam about 12 inches thick; and (2) light gray, iron mottled silty clay loam extending to 53 inches.

Pocker soils have slow permeability. Effective depth is more than 60 inches. Available water capacity is high. Runoff is very slow, and the erosion hazard is slight.

A representative profile of Pocker silty clay loam is in an area of Pershing County, Nevada approximately 40 miles south of Winnemucca about 1,000 feet north and 1,000 feet west of the southeast corner of section 11, T. 28 N., R. 38 E.

A11--0 to 1 inch, light gray (10YR 7/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong, fine platy structure; soft, friable, sticky, plastic; few very fine roots; many very fine interstitial pores; many fine and medium vesicular pores; strongly effervescent; strongly salt affected; very strongly alkaline (pH 9.6); abrupt smooth boundary. 1 to 3 inches thick.

A12--1 to 4 inches, pale brown (10YR 6/3) silty clay loam, dark brown (10YR 4/3) moist; weak, very fine granular structure; soft, friable, sticky, plastic; few very fine and fine

roots; many very fine interstitial pores; strongly effervescent; strongly salt affected; very strongly alkaline (pH 9.6); abrupt smooth boundary. 2 to 5 inches thick.

C1--4 to 12 inches, very pale brown (10YR 7/3) silty clay loam, dark brown (10YR 4/3) moist; strong, coarse platy structure; hard, friable, sticky, plastic; many very fine and few fine roots; many very fine and fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.5); clear smooth boundary. 6 to 10 inches thick.

C2--12 to 21 inches, light gray (10YR 7/2) silty clay loam with few fine distinct (7.5YR 5/6, 3/3) iron mottles, dark brown (10YR 4/3) moist; weak medium platy structure; hard, friable, sticky, plastic; many very fine, fine, and few medium roots; many very fine and few fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 6 to 12 inches thick.

C3--21 to 28 inches, light gray (10YR 7/2) silty clay loam, dark brown (10YR 4/3) moist; massive; hard, firm, sticky, plastic; few very fine and fine roots; many very fine and fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.6); diffuse smooth boundary. 5 to 10 inches thick.

C4--28 to 42 inches, light gray (10YR 7/2) silty clay loam, dark brown (10YR 4/3) moist; massive; hard, friable, sticky, plastic; common very fine and fine roots; many very fine and fine tubular pores; few cicada channels filled with soil; violently effervescent; very strongly alkaline (pH 9.5); clear smooth boundary. 10 to 16 inches thick.

C5--42 to 53 inches, light gray (10YR 7/2) silty clay loam with common medium faint mottles, dark brown (10YR 4/3) moist; massive; hard, friable, sticky, plastic; few very fine and fine roots; many micro and very fine tubular pores; violently effervescent; very strongly alkaline (pH 9.6).

Pocker soils are usually dry, mainly in the summer and fall months, but are moist in the winter and spring months. Reaction ranges from very strong to strongly alkaline and tends to decrease with depth. These soils are normally saline and alkali. Textures

of the 10 to 40 inch control section are clay, silty clay, or silty clay loam with strata of silt loam or loam present in some profiles. The average clay content is 35 to 50 percent.

Pocker silty clay loam (63).--This soil occurs as irregularly shaped areas on smooth, nearly level, low lying terraces and flood plains. It has the profile described as representative for the soil series. Included are about 15 percent Prida, Raglan, Needle Peak, Trident, Sombrero, and Duffer soils.

Seasonal high water table is at 4 to 6 feet. The soil is subject to occasional flooding from spring runoff.

This soil is moderately to severely saline-alkali affected, and therefore, is very poorly suited for use as irrigated cropland. It is used primarily for rangeland and wildlife habitat.

Land capability unit IVw-64, irrigated;* VIIw-227, dryland

Range site NV-24-11 Sodic flat

Wildlife suitability group 3-3-I, irrigated; --34, dryland

*Only those areas with moderate saline-alkali conditions are included in capability unit IVw-64. Those areas with severe saline-alkali conditions are considered unsuitable for use as irrigated cropland, and therefore, are classified in capability unit VIIw-227, only.

Preble Series

Preble series consists of deep, moderately well and somewhat poorly drained, saline-alkali affected soils formed in alluvium from mixed rocks, lake sediments, and volcanic ash. They are on nearly level terraces at elevations of 4,000 to 5,000 feet. Slopes are 0 to 2 percent. The mean annual precipitation is 7 to 9 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 120 days. The native vegetation is principally greasewood with some saltbush, rabbitbrush, squirreltail, saltgrass, cheatgrass and other annuals.

Typical Preble soil profiles have three main parts: (1) light gray silt loam about 10 inches thick; (2) light gray, stratified, weakly cemented, fine sandy loam and very fine sandy loam containing durinodes about 45 inches thick; and (3) light gray gravelly sand extending to 65 inches.

Preble soils have very slow permeability. Effective depth is more than 60 inches. Available water capacity is moderately high to high. Runoff is very slow and the erosion hazard is slight.

A representative profile of Preble silt loam, strongly saline-alkali is in an area of Humboldt County, Nevada about 3 1/2 miles southwest of Winnemucca about 1,000 feet east and 1,600 feet north of the southwest corner of section 2, T. 35 N., R. 37 E.

A1--0 to 4 inches, light gray (10YR 7/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium platy structure; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine and fine vesicular pores; slightly effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary. 3 to 6 inches thick.

C1--4 to 10 inches, light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and few fine tubular pores; slightly effervescent; very strongly alkaline (pH 9.6); abrupt smooth boundary. 5 to 8 inches thick.

C2si--10 to 25 inches, light gray (2.5Y 7/2) micaceous fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; very hard, firm, nonsticky, nonplastic; common very fine and few fine roots; few very fine and fine tubular pores, and many micro interstitial pores; weakly silica cemented; slightly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 10 to 17 inches thick.

C3si--25 to 41 inches, light gray (2.5Y 7/2) very fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; hard, firm, nonsticky, slightly plastic; common very fine and few fine roots; few very fine and fine tubular, and many micro interstitial pores; weakly silica cemented, very thin silica films in some pores, and few 1/2 to 3/4 inch diameter very hard and very firm durinodes; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. 12 to 18 inches thick.

C4sica--41 to 55 inches, light bray (2.5Y 7/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; very hard, very firm, nonsticky, nonplastic; few very fine and fine roots; many micro interstitial, and few very fine tubular pores; weakly silica cemented; common durinodes; few large faint white (2.5Y 8/2) soft seams of lime; strongly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. 10 to 18 inches thick.

C5--55 to 65 inches, light gray (2.5Y 7/2) micaceous gravelly sand, grayish brown (2.5Y 5/2) moist; single grained; few very fine and fine roots; many very fine interstitial pores; 25 percent fine gravel; common medium distinct mottles, dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/6), and brownish yellow (10YR 6/8) moist; slightly effervescent; strongly alkaline (pH 8.6).

Depth to the weakly cemented Csi horizons ranges from 8 to 14 inches. The 10 to 40 inch control section is very fine sandy loam or fine sandy loam with average clay content less than 18 percent. These soils are moderately to strongly alkaline. The Csi horizons have 20 to 75 percent durinodes.

Preble silt loam, slightly saline-alkali (64).--This soil occurs as irregularly shaped areas on nearly level terraces adjacent to the flood plains of the Humboldt River and other streams. This soil is similar to that described for the series except it is slightly saline-alkali and in places may have a very fine sandy loam surface texture. Included are about 10 percent Ninch and Valmy soils.

The native vegetation is primarily rabbitbrush, saltgrass, squirreltail and cheatgrass. The runoff is very slow, and the erosion hazard is slight. Seasonal high water table is at 5 to 10 feet.

This soil is moderately well suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit IIIw-64, irrigated; VIw-227, dryland

Range site NV-24-17 Semidesert sandy

Wildlife suitability group 2-4-I, irrigated; --34, dryland

Preble silt loam, strongly saline-alkali (65).--This soil occurs as irregularly shaped areas on nearly level terraces adjacent to the flood plains of the Humboldt River and other streams. It has the profile described as representative for the series. It is strongly saline-alkali and concentration of salts tend to decrease with depth. Included are about 10 percent Ninch, Valmy, and some Sonoma soils.

The vegetation is primarily greasewood, saltbush, and saltgrass. Runoff is very slow, and the erosion hazard is slight. Seasonal high water table is at 3 to 5 feet.

This soil is poorly suited for irrigated cropland due to high salt concentrations. It is used principally for rangeland and wildlife habitat.

Land capability unit IVw-61, irrigated; VIIw-221, dryland

Range site NV-24-11 Sodic flat

Wildlife suitability group --34, dryland

Prida Series

The Prida series consists of very deep, moderately well and somewhat poorly drained soils. They formed in silty alluvium from mixed rock sources including volcanic ash. Slopes are 0 to 2 percent. They are on nearly level terraces and alluvial fans at elevations of 4,000 to 5,000 feet. The mean annual precipitation is 7 to 9 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 110 days. Native vegetation consists of shadscale, greasewood, seepweed, Basin wildrye, and squirreltail.

Typical Prida soil profiles have three main parts: (1) light brownish gray silt loam about 7 inches thick; (2) pale brown saline silt loam about 18 inches thick; and (3) light gray, silty clay loam with a few mottles and durinodes extending to 60 inches.

Prida soils have slow permeability. Effective depth is more than 60 inches. Available water capacity is high. Runoff is very slow and may pond on the surface for short periods following intensive rains. The erosion hazard is slight.

A representative profile of Prida silt loam, strongly saline is in an an area of Humboldt County, Nevada approximately 9 miles southwest of Winnemucca about 300 feet south and 70 feet west of the east quarter corner of section 34, T. 35 N., R. 37 E.

A11--0 to 3 inches, light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure, parting to weak fine granualar structure; soft, friable, nonsticky, nonplastic; common very fine roots; many very fine and micro interstitial pores; neutral (pH 7.2); abrupt smooth boundary. 3 to 5 inches thick.

A12--3 to 7 inches, light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; hard, friable, slightly sticky, slightly plastic; many very fine, and few fine roots; few very fine and fine tubular, and many very fine and fine vesicular pores; mildly alkaline (pH 7.4); clear smooth boundary. 3 to 6 inches thick.

C1sa--7 to 15 inches, pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, and common fine roots; many very fine, and common fine tubular pores; high salt content; common fine distinct white (10YR 8/2) flecks of gypsum; slightly effervescent; mildly alkaline (pH 7.8); clear smooth boundary. 6 to 10 inches thick.

C2cs--15 to 25 inches, very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky, plastic; many very fine, and few fine roots; many very fine tubular pores; common very fine distinct white (10YR 8/2) gypsum flecks; slightly effervescent; mildly alkalin (pH 7.8); abrupt smooth boundary. 6 to 10 inches thick.

C3cs--25 to 36 inches, light gray (2.5Y 7/2) light silty clay loam, grayish brown (2.5Y 5/2) moist; weak fine sub-angular blocky structure; hard, friable, slightly sticky, slightly plastic; many very fine and few fine roots; common very fine and fine tubular, and few very fine exped pores; common fine distinct white (10YR 8/2) gypsum flecks and crystals; slightly effervescent; mildly alkaline (pH 7.8); clear smooth boundary. 6 to 13 inches thick.

C4sics--36 to 46 inches, light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; few fine and medium distinct iron mottles, very dark brown (10YR 3/2) and yellowish brown (10YR 5/4) moist; moderate medium and fine angular blocky structure; very hard, firm, sticky, plastic; few fine, and common very fine roots; many very fine exped, and few very fine and fine tubular pores; common thin silica films in pores and on some faces of peds; few firm durinodes; common fine distinct white gypsum and salt flecks; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. 6 to 13 inches thick.

IIC5cs--46 to 61 inches, light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; moderate thick platy structure that parts to strong coarse and medium angular blocky structure; very hard, very firm, sticky, plastic;

few very fine roots; common very fine, few fine tubular, and common very fine exped pores; common fine distinct white gypsum flecks; common ostracod shells; slightly effervescent; moderately alkaline (pH 8.0).

Depth to the unconformable lacustrine material is 30 to 40 inches. The mean annual soil temperature is 47° to 52° F. The A1 horizon is generally noncalcareous but is slightly or strongly calcareous in some profiles. The 10 to 40 inch control section is silt loam or silty clay loam with 20 to 35 percent clay. The content of gypsum is variable and may be lacking in some profiles. The Csi horizon has 20 to 50 percent durinodes.

Prida silt loam, slightly saline-alkali (66).--This soil occurs as large irregularly shaped areas on nearly level terraces and low parts of alluvial fans with slopes of 0 to 2 percent. It has a profile similar to that described as representative for the soil series except it is slightly saline-alkali. Included are about 15 percent Needle Peak and Raglan soils, and strongly saline-alkali Prida soils.

The native vegetation is principally greasewood, shadscale, Basin wildrye, and squirreltail. Runoff is very slow and may pond for short periods following intensive rains. A seasonal high water table is at 5 to 7 feet. The erosion hazard is slight.

This soil is not well suited for use as irrigated cropland. If so used, saline-alkali tolerant crops should be selected. It is used principally as range for livestock.

Land capability unit IIIw-64, irrigated; VIw-227, dryland

Range site NV-24-3 Desert sodic terrace

Wildlife suitability group 3-3-I, irrigated; --33, dryland

Prida silt loam, strongly saline-alkali (67).--This soil occurs as large irregularly shaped areas on nearly level terraces and alluvial fans with slopes of 0 to 2 percent. It has the profile described as representative for the soil series. Included are about 15 percent Needle Peak, Raglan, and slightly saline-alkali Prida soils.

The native vegetation is principally greasewood, shadscale and seepweed. Runoff is very slow and may pond for short periods following intensive rains. The erosion hazard is slight. A seasonal high water table is at 3 to 5 feet.

This soil is not suited for irrigated cropland because it is strongly saline-alkali. It is used mainly as range for livestock.

Land capability unit VIIw-227, dryland

Range site NV-24-3, Desert sodic terrace

Wildlife suitability group 3-2-I, irrigated; --34, dryland

Pumper Series

The Pumper series consists of somewhat excessively drained soils having gravels at shallow depths. They formed in loamy loess high in volcanic ash deposited on very gravelly sandy alluvivum from mixed rock sources. Slopes are 0 to 4 percent. They are on nearly level or gently sloping alluvial fans at elevations of 4,000 to 5,000 feet. The mean annual precipitation is 4 to 8 inches, mean annual temperature is 48° to 52° F., and the frost-free season is 100 to 120 days. The vegetation consists mainly of shadscale and bud sagebrush.

Typical Pumper soil profiles have three main parts: (1) very pale brown loam about 12 inches thick; (2) light brownish gray very gravelly loam about 5 inches thick; and (3) pale brown or light brownish gray very gravelly sand that extends to 60 inches.

Pumper soils have moderately permeability. Effective depth is more than 60 inches. The available water capacity is low to moderately low. Runoff is slow, and the erosion hazard is slight to moderate.

A representative profile of Pumper loam is in an area of Pershing County, Nevada approximately 20 miles south of Winnemucca about 500 feet south and 500 feet east of the west quarter corner of section 21, T. 33 N., R. 38 E.

A1--0 to 3 inches, very pale brown (10YR 7/3) loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky, slightly plastic; few micro and very fine roots; many medium and fine vesicular pores; moderately alkaline (pH 8.4); abrupt smooth boundary. 1 to 4 inches thick.

B2--3 to 12 inches, light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky, slightly plastic; many fine roots; many very fine interstitial pores; strongly alkaline (pH 9.0); clear smooth boundary. 6 to 16 inches thick.

IIB3ca--12 to 17 inches, light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; strongly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. 0 to 10 inches thick.

IIIC1ca--17 to 23 inches, pale brown (10YR 6/3) very gravelly sand, with many white (10YR 8/1) lime coatings on undersides of gravel fragments, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine interstitial pores; violently effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 4 to 9 inches thick.

IIIC2--23 to 60 inches, light brownish gray (10YR 6/2) very gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose when dry and moist; few very fine roots; many very fine and fine, and few medium interstitial pores; violently effervescent; strongly alkaline (pH 8.6).

Thickness of the solum and depth to the very gravelly sand IIB or IIIC horizons ranges from 11 to 24 inches. Mean annual soil temperature is 49° to 54° F. These soils are usually dry, mainly during the late spring, summer and fall months. Texture of the 10 to 40 inch control section, after mixing, is sandy and contains 50 to 80 percent gravel.

Pumper loam (68).--This soil occurs as a large, oval shaped area, and several small, irregularly shaped areas on nearly level alluvial fans with slopes of 0 to 2 percent. It has the profile described as representative for the series. Included are about 15 percent Adelaide, Blackhawk, Dun Glen, McConnel, and Raglan soils.

The native vegetation is shadscale and bud sagebrush. Runoff is slow, and the erosion hazard is slight to moderate.

This soil is mainly used as range for livestock. It is suitable for irrigated crop production if water for irrigation becomes available.

Land capability unit IIIs-45, irrigated; VIIc-240, dryland

Range site NV-24-2 Desert loamy

Wildlife suitability group 3-4-I, irrigated; --43, dryland

Rad Series

Rad series consists of deep, well drained soils formed in alluvium from mixed rocks including andesite, rhyolite, tuffs, sedimentary rock, and some volcanic ash. They are on smooth, nearly level to moderately sloping terraces and alluvial fans at elevations of 4,000 to 5,000 feet. Slopes are 0 to 8 percent. The mean annual precipitation is 8 to 10 inches, mean annual air temperature is 47° to 52° F., and the frost-free season is 100 to 110 days. The vegetation is big sagebrush, rubber rabbitbrush, spiny hopsage, Indian ricegrass, western wheatgrass, squirreltail, cheatgrass, and other annuals.

Typical Rad profiles have three main parts: (1) pale brown, stratified, fine sandy loam, and loam about 6 inches thick; (2) a pale brown loam about 8 inches thick; and (3) very pale brown to white fine sandy loam and silt loam containing silica-cemented nodules which extends to 60 inches.

Rad soils have slow permeability. Effective depth is more than 60 inches. Available water capacity is moderately high to high. Runoff is slow, and the erosion hazard is slight to moderate depending on slope.

A representative profile of Rad fine sandy loam is in an area of Humboldt County, Nevada approximately 1 1/2 miles east of Winnemucca about 500 feet west of the east quarter corner os section 21, T. 36 N., R. 38 E.

Ap--0 to 6 inches, pale brown (10YR 6/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine platy structure; soft, very friable, nonsticky, nonplastic; common very fine, and few fine roots; many very fine interstitial pores; neutral (pH 7.2); clear smooth boundary. 6 to 10 inches thick.

B2--6 to 14 inches, pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to weak coarse platy when displaced; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, and few fine roots; many very fine tubular pores; mildly alkaline (pH 7.4); clear smooth boundary. 8 to 10 inches thick.

C1--14 to 20 inches, pale brown (10YR 6/3) very fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; common very fine, and few fine roots; many very fine tubular and interstitial pores; strongly alkaline (pH 8.6); clear wavy boundary. 6 to 8 inches thick.

C2si--20 to 34 inches, light gray (10YR 7/2) very fine sandy loam, brown (10YR 4/3) moist; massive; hard, friable, nonsticky, nonplastic; common very fine, and few fine roots; few fine tubular and many very fine tubular pores; contains about 50 percent extremely hard, firm, brittle cylindrical durinodes; few thin silica films line pores and bridge sand grains; matrix is noneffervescent, but is effervescent in occasional spots in durinodes; strongly alkaline (pH 8.8); clear smooth boundary. 8 to 15 inches thick.

C3sica--34 to 39 inches, white (2.5Y 8/2) weakly silica and lime cemented very fine sandy loam, brown (10YR 4/3) moist; massive; hard, firm, nonsticky, nonplastic; few very fine and fine roots; few fine, and many very fine tubular pores; many thin very pale brown (10YR 7/3) silica films in pores, and common thin silica bridges, and randomly oriented, discontinuous laminae; white (10YR 8/1) lime coatings occur on laminar surfaces; violently effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. 5 to 8 inches thick.

C4si--39 to 60 inches, very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine and few fine tubular pores; contains about 10 percent hard, firm, brittle, durinodes; effervescent; very strongly alkaline (pH 9.6).

The solum is 12 to 20 inches thick. Rad soils are usually dry, mainly in the summer and fall, but are moist in the winter and spring. Texture of the 10 to 40 inch control section is dominantly very fine sandy loam and silt loam but includes strata of loam, fine sandy loam

or sandy loam in some profiles. The solum is noncalcareous and neutral or mildly alkaline. The C horizons range from noncalcareous in the upper strata to strongly calcareous in the lower strata and reaction ranges from strongly to very strongly alkaline.

Rad loamy fine sand, 4 to 8 percent slopes (69).--This soil occurs as broadly dissected, broad areas on alluvial fans and terraces. It has a profile similar to that described for the soil series except the surface is loamy fine sand and the Csi horizon is brittle and firm and contains only a few durinodes. Also, at some locations it is underlain at 40 to 60 inch depth by cemented gravel and cobbles. Included are about 15 percent Bliss, Valmy, and other Rad soils.

The vegetation is primarily big sagebrush, rabbitbrush, horsebrush, spiny hopsage, squirreltail and cheatgrass. Available water capacity is high. Runoff is slow, and the erosion hazard by wind is high.

This soil is not used for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capabiity unit VIc-220, dryland

Range site NV-24-17 Semidesert sandy

Wildlife suitability group --42, dryland

Rad fine sandy loam, 0 to 2 percent slopes (70).--This soil occurs as broad, flat areas on alluvial fans and terraces. It has the profile described as representative for the soil series. Included are about 15 percent Valmy, Bliss, and other Rad soils.

The vegetation is primarily big sagebrush, rabbitbrush, horsebrush, spiny hopsage, Indian ricegrass, western wheatgrass, squirreltail and cheatgrass. The available water capacity is high. Runoff is slow, and the erosion hazard is slight.

A small acreage of this soil is used for irrigated cropland. The remainder is used principally for rangeland and wildlife habitat.

Land capability unit IIc-1, irrigated; VIc-220, dryland

Range site NV-24-17 Semidesert sandy

Wildlife suitability group 1-4-I, irrigated; --42, dryland

Rad fine sandy loam, 2 to 4 percent slopes (71).--This soil occurs as broad, flat areas on alluvial fans and terraces. It has a profile similar to that described for the soil series, except it has a 12-inch thick solum and lime at 18 inches. Included are about 15 percent Bliss, Valmy, and other Rad soils.

The native vegetation is primarily big sagebrush, rabbitbrush, horsebrush, spiny hopsage, Indian ricegrass, western wheatgrass, squirreltail and cheatgrass. Available water capacity is high. Runoff is slow, and the erosion hazard is slight.

This soil is suitable for irrigated cropland. Virgin areas are used principally for rangeland and wildlife habitat.

Land capability unit IIe-20, irrigated; VIc-220, dryland

Range site NV-24-17 Semidesert sandy

Wildlife suitability group 1-4-I, irrigated; --42, dryland

Raglan Series

Raglan series are deep, well and moderately well drained soils formed in alluvium and lacustrine deposits from tuff, basalt, limestone, chert, and some volcanic ash. They are on smooth, nearly level to moderately sloping lacustrine terraces and their interterrace slopes at elevations of 4,000 to 4,800 feet. Slopes are 0 to 9 percent. The mean annual precipitation is 6 to 9 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 120 days. The vegetation is greasewood, spiny hopsage, shadscale, Great Basin wildrye, and squirreltail.

Typical Raglan soil profiles have four main parts: (1) light brownish gray silt loam about 6 inches thick; (2) light gray silt loam containing durinodes about 29 inches thick; (3) light gray, iron mottled, silty clay loam 17 inches thick; and (4) light gray very fine sandy loam that extends to 64 inches.

Raglan soils have moderately slow permeability. Effective depth is more than 60 inches. Available water capacity is high. Runoff is slow or medium depending on slopes, and the erosion hazard is slight to moderate.

A representative profile of Raglan silt loam is in an area of Humboldt County, Nevada approximately 8 miles southwest of Winnemucca about 2,100 feet west of the southeast corner of section 36, T. 35 N., R. 37 E.

A1--0 to 2 inches, brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate thin platy structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine vesicular and few fine tubular pores; effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. 1 to 3 inches thick.

B21--2 to 6 inches, light gray (10YR 7/2) heavy silt loam, brown (10YR 5/3) moist; moderate thin platy structure; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots between plates; common very fine vesicular and many very fine and fine interstitial pores; effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. 3 to 5 inches thick.

B3--6 to 14 inches, very pale brown (10YR 4/3) silt loam, yellowish brown (10YR 5/4) moist; weak thick platy structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine, and few medium roots; few very fine and fine tubular and many very fine and fine interstitial pores; few thin silica bridges on some sand grains and in pores; strongly effervescent; strongly alkaline (pH 8.8); clear smooth boundary. 6 to 10 inches thick.

C1si--14 to 35 inches, light gray (2.5Y 7/2) silt loam with 50 percent concretionary durinodes, grayish brown (2.5Y 5/2) moist; massive; slightly hard and very hard, friable and firm, slightly sticky, slightly plastic; common very fine and few fine roots; few very fine tubular, and few very fine and fine interstitial pores; violently effervescent; strongly alkaline (pH 9.0); clear smooth boundary. 17 to 25 inches thick.

IIC2--35 to 52 inches, light gray (2.5Y 7/2) silty clay loam, with common medium and fine strong brown (7.5YR 5/6) iron mottles and a few fine distinct white (10YR 8/1) gypsum segregations, grayish brown (2.5Y 5/2) moist; moderate medium platy structure; hard, firm, sticky, plastic; few fine, and common very fine roots; few very fine tubular and common very fine interstitial pores; common crayfish shells; violently effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. 10 to 20 inches thick.

IIIC3--52 to 64 inches, light gray (2.5Y 7/2) very fine sandy loam, with common fine strong brown (7.5YR 5/6) iron mottles and few fine distinct white (10YR 8/1) gypsum segregations, grayish brown (2.5Y 5/2) moist; moderate medium platy structure; slightly hard, friable, nonsticky, slightly plastic; common very fine and few fine roots; common very fine tubular pores; effervescent in spots and noneffervescent elsewhere; strongly alkaline (pH 8.6).

Raglan soils are usually dry, mainly during the summer and fall months, but are moist in the winter and spring months. The 10 to 40 inch control section is somewhat stratified and includes strata of loam, silt loam, very fine sandy loam, light clay loam and silty clay loam. It has an average clay content of 18 to 25 percent. The solum is noncalcareous or weakly calcareous while the C horizons are strongly calcareous. Reaction ranges from mildly alkaline in the A1 horizons to very strongly alkaline in the C horizons.

Raglan silt loam, slightly saline-alkali (72).--This soil occurs as irregularly shaped areas on smooth, nearly level terraces. This soil has the profile described as representative for the soil series. Included are about 15 percent Dun Glen, Needle Peak, Prida, and strongly saline-alkali Raglan soils.

The vegetation is primarily spiny hopsage, shadscale, Great Basin wildrye and squirreltail. Runoff is slow, and the erosion hazard is slight. Seasonal high water table is below 6 feet.

This soil is suited for irrigated cropland. It is used principally for rangeland and wildlife. A few small areas are used for cropland. Irrigation water is provided by pumping from deep wells. Alfalfa and small grains are the principal crops.

Land capability unit IIs-46, irrigated; VIs-221, dryland

Range site NV-24-2 Desert loamy

Wildlife suitability group 1-4-I, irrigated; --43, dryland

Raglan silt loam, strongly saline-alkali (73).--This soil occurs as elongated, oval shaped areas on smooth, nearly level terraces. The soil is similar to that described for the soil series except it has a solum only 11 inches thick; it is strongly saline-alkali affected; and has a seasonal high water table at 3.5 to 6 feet. Included are about 15 percent Dun Glen, Needle Peak, Prida, and slightly saline-alkali Raglan soils.

The vegetation is primarily greasewood, shadscale, Great Basin wildrye, and squirreltail. Runoff is slow and the erosion hazard is slight.

This soil is suited for irrigated cropland if drained and reclaimed. It is used principally for rangeland and wildlife habitat.

Land capability unit IIIw-61, irrigated; VIIs-221 dryland

Range site NV-24-3 Desert sodic

Wildlife suitability group 2-3-I, irrigated; --34, dryland

Rebel Series

The Rebel series consists of deep, well drained soils formed in alluvium from schist, slate, gneiss, granodiorite, limestone, and some volcanic ash. They are on nearly level and gently sloping alluvial fans and terraces at elevations of 4,000 to 5,000 feet. Slopes are 0 to 4 percent. The mean annual precipitation is 8 to 10 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 110 days. Vegetation is big sagebrush, rabbitbrush, greasewood, squirreltail, and Great Basin wildrye.

Typical Rebel soil profiles have three main parts: (1) a light brownish gray loam about 4 inches thick; (2) pale brown sandy loam and very fine sandy loam about 17 inches thick; and (3) very pale brown stratified loamy very fine sand, sandy loam and fine sandy loam which extends to 60 inches.

Rebel soils have moderately rapid permeability. Effective depth is more than 60 inches. Available water capacity is moderately high to high. Runoff is slow, and the erosion hazard is slight to moderate.

A representative profile of Rebel loam is in an area of Pershing County, Nevada approximately 12 miles south of Winnemucca, about 100 feet north of the southeast corner of section 29, T. 34 N., R. 38 E.

A11--0 to 4 inches, light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; soft, friable, nonsticky, nonplastic; many very fine roots; common very fine vesicular pores; neutral (pH 7.0); clear smooth boundary. 2 to 5 inches thick.

IIA12--4 to 8 inches, pale brown (10YR 6/3) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; neutral (pH 7.2) abrupt smooth boundary. 0 to 10 inches thick.

IIIB2--8 to 21 inches, pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; common very fine interstitial and tubular pores; mildly alkaline (pH 7.4); clear smooth boundary. 8 to 15 inches thick.

IIIC1--21 to 38 inches, very pale brown (10YR 7/3) loamy very fine sandy loam, brown (10YR 4/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; common very fine interstitial and tubular pores; slightly effervescent; very strongly alkaline (pH 9.0); abrupt wavy boundary. 10 to 20 inches thick.

IIIC2ca--38 to 44 inches, very pale brown (10YR 7/3) sandy loam, brown (10YR 4/3) moist; massive; hard, friable, nonsticky, nonplastic; few very fine roots; few very fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.4); abrupt wavy boundary. 0 to 10 inches thick.

IIIC3ca--44 to 60 inches, pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; soft, friable, nonsticky, nonplastic; few very fine roots; many very fine interstitial pores; strongly effervescent; strongly alkaline (pH 9.0).

Solum thickness and depth to lime ranges from 10 to 30 inches. The 10 to 40 inch control section is commonly fine sandy loam but ranges to include strata of very fine sandy loam, loamy very fine sand and sandy loam. The average clay content is 10 to 18 percent and content of sand is 50 to 80 percent. The solum is neutral or mildly alkaline. The C horizons are calcareous and moderately to very strongly alkaline.

Rebel loam, 0 to 2 percent slopes (74).--This soil occurs as large, fan-shaped areas on nearly level alluvial fans. This soil has the profile described as representative for the soil series. Included are about 15 percent McConnel, Needle Peak, and Orovada soils.

The vegetation is primarily big sagebrush, squirreltail, and cheatgrass. Runoff is slow, and the erosion hazard is slight.

This soil is well suited for irrigated cropland. It is used principally for growing alfalfa and small grain, and as rangeland and wildlife habitat. Where irrigated crops are grown, water is provided by pumping from deep wells.

Land capability unit IIc-1, irrigated; VIc-220, dryland

Range site NV-24-20 Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 1-4-I, irrigated; --42, dryland

Rebel loam, 2 to 4 percent slopes (75).--This soil occurs as small, fan-shaped areas on gently sloping alluvial fans. It has a profile that is similar to that described for the soil series except the subsoil and substrata is mostly fine sandy loam, and it is on 2 to 4 percent slopes. Included are about 15 percent Bliss, McConnel, and Orovada soils.

The vegetation is primarily big sagebrush, squirreltail, and cheatgrass. Runoff is slow, and the erosion hazard is moderate.

This soil is suitable for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit IIe-20, irrigated; VIc-220, dryland

Range site NV-24-20 Droughty loam, 8 to 10 inch precipitation zone

Wildlife suitability group 1-4-I, irrigated; --42, dryland.

Rock outcrop

This land type consists of various-sized areas on nearly level to extremely steep alluvial fans, hills and mountain slopes. The rock is primarily basalt, rhyolite, tuffs, granite, limestone and shale. Other igneous sedimentary and metamorphic rocks are included. Some areas with very thin layers of soil material over bedrock are included.

This land type is of no value to agriculture. It does have value for wildlife, recreation and esthetic purposes.

It has been mapped only in associations and complexes with named soils.

Land capability unit VIIIs, dryland

Rose Creek Series

Rose Creek series are deep, poorly drained soils formed in stratified loamy and sandy alluvium from mixed rocks. They are on nearly level flood plains at elevations of 4,000 to 5,000 feet. Slopes are 0 to 2 percent. The mean annual precipitation is 6 to 10 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 120 days. The vegetation is willows, wildrose, creeping wildrye, saltgrass, and wiregrass.

Typical Rose Creek soil profiles have two main parts: (1) a gray loam about 8 inches thick; and (2) light brownish gray, stratified loam, very fine sandy loam, fine sandy loam, sandy loam, and sand extending to 60 inches.

Rose Creek soils have moderate permeability. Effective depth is more than 60 inches. Available water capacity is moderately high to high. Runoff is very slow, and the erosion hazard is slight.

A representative profile of Rose Creek loam is in an area of Humboldt County, Nevada approximately 1 1/2 miles northeast of Winnemucca, about 1,700 feet south and 500 feet west of the southeast corner of section 7, T. 36 N., R. 38 E.

A1--0 to 8 inches, gray (10YR 5/1) loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure; hard, friable, nonsticky, slightly plastic; many fine, medium and coarse roots; many fine medium and coarse tubular pores; many fine cracks between peds; slightly effervescent; strongly alkaline (pH 9.0); clear smooth boundary. 5 to 10 inches thick.

C1--8 to 22 inches, light brownish gray (10YR 6/2) finely stratified loam, very fine sandy loam, and fine sandy loam, dark gray (10YR 4/1) moist; massive; hard, friable, nonsticky, slightly plastic; many fine and medium roots;

many fine and medium tubular pores; few fine faint lime filaments; slightly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. 10 to 16 inches thick.

C2--22 to 34 inches, light brownish gray (10YR 6/2) micaceous sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; many fine and medium roots; many very fine and medium tubular pores; moderately effervescent; strongly alkaline (pH 9.0); abrupt smooth boundary. 8 to 15 inches thick.

C3--34 to 43 inches, light brownish gray (10YR 6/2) micaceous sand, dark grayish brown (10YR 4/2) moist; single grain; loose when dry and moist, nonsticky, nonplastic; common fine and medium roots; many interstitial pores; slightly effervescent; strongly alkaline (pH 9.0); abrupt smooth boundary. 8 to 12 inches thick.

C4--43 to 60 inches, light gray (10YR 7/1) finely stratified silt loam, and very fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky, plastic; few fine and medium roots; few fine and medium tubular pores; strongly effervescent; strongly alkaline (pH 8.8).

These soils are saturated for at least one month during most years. The 10 to 40 inch control section is stratified ranging in texture from sand to silt loam and occasionally silty clay loam, and generally becomes coarser with depth. The coarser textures are modified by gravel in some profiles. Fine sandy loam, sandy loam, or very fine sandy loam are normally the dominant textures. The average clay content is less than 18 percent.

Rose Creek loam (76).--This soil occurs as long, narrow areas on nearly level flood plains with slopes of 0 to 2 percent. This soil has the profile described as representative for the soil series. Included are about 15 percent Humboldt and Sonoma soils.

Runoff is very slow, and the erosion hazard is slight. Seasonal high water table is at 1.5 to 3 feet, usually during late winter or early spring months. This soil is subject to occasional, brief overflow.

This soil is poorly suited for irrigated cropland. It is used principally for rangeland, pasture and wildlife habitat. Meadow or grass hay is harvested from some areas. Development of the soil for cropland will require drainage and flood protection.

Land capability unit IIIw-60, irrigated; VIw-220, dryland

Range site NV-24-8 Moist flood plain

Wildlife suitability group 2-2-I, irrigated; --42, dryland

Sagouspe Series

Sagouspe series are deep, somewhat poorly drained sandy soils formed in alluvium from mixed rocks. They are on low stream terraces and flood plains at elevations of 3,800 to 4,500 feet. Slopes are 0 to 4 percent. The mean annual precipitation is 4 to 8 inches, mean annual air temperature is 51° to 55° F., and the frost-free season is 100 to 130 days. The vegetation is black greasewood, rubber rabbitbrush, and saltgrass.

Typical Sagouspe soil profiles have two parts: (1) a very pale brown loamy fine sand surface layer about 5 inches thick; and (2) light gray, stratified loamy sands and sands with occasional strata of sandy loam or silt loam.

Sagouspe soils have rapid permeability. Effective depth is more than 60 inches. Available water capacity is moderately low to moderately high. Runoff is very slow, and the erosion hazard by wind is high.

A representative profile of Sagouspe loamy fine sand is in an area of Humboldt County, Nevada approximately 2 miles northeast of Golconda, about 1,800 feet north and 1,300 feet west of the southeast corner of section 27, T. 36 N., R. 40 E.

A1--0 to 5 inches, very pale brown (10YR 7/3) loamy fine sand, brown (10YR 4/3) moist; weak coarse platy structure; soft, very friable, nonsticky, nonplastic; many very fine and fine and few medium roots; many very fine interstitial pores; slightly effervescent; strongly alkaline (pH 8.8); clear smooth boundary. 3 to 6 inches thick.

C1--5 to 12 inches, pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky, nonplastic; many very fine and fine

and few medium roots; many very fine and few fine and medium tubular pores; slightly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 5 to 9 inches thick.

C2--12 to 23 inches, light gray (10YR 7/2) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine and fine and few medium roots; many very fine interstitial and few fine tubular pores; few hard, firm durinodes; slightly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 9 to 15 inches thick.

C3--23 to 31 inches, light gray (10YR 7/2) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine and few fine roots; many very fine interstitial and few fine tubular pores; few hard, firm durinodes; slightly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 5 to 10 inches thick.

C4--31 to 41 inches, light gray (10YR 7/2) sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine and few fine roots; many very fine interstitial pores; few durinodes; slightly effervescent; strongly alkaline (pH 9.6); abrupt smooth boundary. 7 to 12 inches thick.

C5--41 to 60 inches, light gray (10YR 7/2) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine interstitial and few very fine and fine tubular pores; slightly effervescent; very strongly alkaline (pH 9.6).

These soils are saturated within 40 inches of the surface during the spring and summer months. The 10 to 40 inch control section is dominantly stratified loamy sands and sands, but contains thin strata of loamy textures. The average texture of the control section is loamy sand or loamy fine sand.

Sagouspe loamy fine sand (77).--This soil occurs as small, elongated areas on low stream terraces and flood plains. The soil has the profile described as representative for the soil series. Included are about 10 percent Humboldt, Preble, Sonoma and Valmy soils.

Runoff is very slow, and the erosion hazard by wind is high. Seasonal high water table is at 3 to 5 feet. The soil is normally saline-alkali.

This soil is poorly suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit VIIw-221, dryland

Range site NV-24-11 Sodic flat

Wildlife suitability group --34, dryland

Shabliss Series

The Shabliss series consists of well drained soils that formed in alluvium from sandstone, shale, slate, argillite, quartzite, rhyolite, andesite and tuff with admixtures of volcanic ash. They are at elevations of 4,000 to 5,500 feet. Slopes are 4 to 15 percent. The mean annual precipitation is 8 to 10 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 130 days. Vegetation is big sagebrush, rabbitbrush, spiny hopsage, squirreltail, Sandberg bluegrass, and cheatgrass.

Typical Shabliss soil profiles have four main parts: (1) a surface layer of light brownish gray very fine sandy loam about 4 inches thick; (2) light brownish gray very fine sandy loam about 11 inches thick; (3) very pale brown strongly cemented duripan about 5 inches thick; and (4) very pale brown stratified very fine sandy loam, fine sandy loam, loamy sand and gravelly loamy sand extending to 62 inches.

Shabliss soils are moderately permeable to the duripan. Effective depth is 12 to 20 inches. Available water capacity is low to moderatly low. Runoff is slow to rapid depending on slopes, and the erosion hazard is moderate to high.

A representative profile of Shabliss very fine sandy loam is in an area of Humboldt County, Nevada about 2 miles southeast of Winnemucca at a site about 1,600 feet south and 400 feet west of the northeast corner of section 34, T. 36 N., R. 38 E.

A1--0 to 4 inches, light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine platy structure; soft, very

B2--4 to 11 inches, light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine interstitial pores; strongly alkaline (pH 8.6); abrupt wavy boundary. 6 to 9 inches thick.

C1si--11 to 15 inches, pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, friable, nonsticky, nonplastic; common very fine roots; few very fine interstitial and tubular pores; 30 percent very hard, very firm, brittle 3/8 to 1-inch cylindrical durinodes; very strongly alkaline (pH 9.0); clear wavy boundary. 4 to 8 inches thick.

C2sicam--15 to 20 inches, very pale brown (10YR 7/3) strongly cemented very fine sandy loam, brown (10YR 5/3) moist; strong medium platy structure; extremely hard, very firm, nonsticky, nonplastic; few very fine roots; few very fine interstitial and tubular pores; many fine distinct white (10YR 8/2) lime laminae; many thin discontinuous silica laminae with some iron mottling on the surface; strongly effervescent; very strongly alkaline (pH 9.0); clear wavy boundary. 5 to 10 inches thick.

C3sica--20 to 29 inches, very pale brown (10YR 7/3) weakly cemented very fine sandy loam, brown (10YR 5/3) moist; massive; very hard, firm, nonsticky, nonplastic; few very fine roots; few very fine interstitial and tubular pores; 30 percent extremely hard, very firm, brittle 1/8 to 1/4-inch durinodes; many fine distinct white (10YR 8/2) lime mottles; violently effervescent; very strongly alkaline (pH 9.0); abrupt wavy boundary. 4 to 10 inches thick.

C4ca--29 to 52 inches, very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist massive; soft, friable, nonsticky, nonplastic; few fine roots; many very fine interstitial pores; violently effervescent; strongly alkaline (pH 8.8); abrupt wavy boundary. 20 to 25 inches thick.

C5sica--52 to 56 inches, very pale brown (10YR 7/3) weakly cemented loamy sand, brown (10YR 5/3) moist; massive; hard, firm, nonsticky, nonplastic; few very fine interstitial and tubular pores; violently effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. 3 to 7 inches thick.

C6ca--56 to 62 inches, very pale brown (10YR 7/3) gravelly loamy sand, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky, nonplastic; few very fine interstitial pores; violently effervescent; very strongly alkaline (pH 9.6).

These soils are dry more than one half the time the soil temperature is above 41° F. Depth to the strongly cemented duripan ranges from 12 to 20 inches. Thickness of the solum ranges from 10 to 15 inches. The hue is 10YR throughout. They are neutral to strongly alkaline. Textures of the control section are usually very fine sandy loam or silt loam but range to include strata of loam, and fine sandy loam. Consistence of the duripan is very hard or extremely hard and firm or very firm. They usually consist of 2 or more strongly cemented layers, interbedded with weakly cemented material or they are massive. They usually contain common to many, thin to moderately thick (usually less than 2 mm thick) discontinuous silica laminae. The C horizons and duripans are strongly or violently effervescent and moderately to very strongly alkaline. Some profiles are gravelly below the duripan. The C horizons may contain up to 30 percent extremely hard, extremely firm, brittle 1/8 to 1/2-inch cylindrical durinodes in a friable or firm matrix.

Shabliss very fine sandy loam, 2 to 8 percent slopes (78).--This soil occurs as large, rectangularly shaped areas on dissected alluvial fans and terraces. It has the profile described as representative for the soil series. Included are about 10 to 15 percent Chiara, Bliss, Orovada, and other Shabliss soils.

The runoff is slow to medium, and the erosion hazard is slight to moderate.

This soil is poorly suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit VIe-21, irrigated; VIIs-231, dryland

Range site NV-24-5 Loamy, 8 to 10 inch precipitation zone

Wildlife suitability group 3-4-I, irrigated; --42, dryland

Shabliss very fine sandy loam, 8 to 15 percent slopes (79).--This soil occurs as large, irregularly shaped areas on dissected alluvial fans and terraces. The soil is similar to that described for the soil series except the duripan occurs at shallower depth, and slopes are 8 to 15 percent. Included are about 15 percent Adelaide, Chiara, Bliss, and other Shabliss soils with slopes of 15 to 30 percent.

The runoff is rapid, and the erosion hazard is high.

This soil is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit VIIs-231, dryland

Range site NV-24-5 Loamy, 8 to 10 inch precipitation zone

Wildlife suitability group 3-4-I, irrigated; --42, dryland

Shepan Series

The Shepan series consists of well drained soils that formed in residuum and colluvium from sandstone, quartzite and rhyolite. Slopes are 30 to 50 percent. They occur at elevations of 5,200 to 6,600 feet. The mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. The vegetation is big sagebrush, Sandberg bluegrass, squirreltail, cheatgrass, lupine, rabbitbrush, and serviceberry.

Typical Shepan soil profiles have three main parts: (1) a surface layer of brown stony loam about 6 inches thick; (2) a brown gravelly clay or clay loam about 36 inches thick; and (3) light yellowish brown gravelly sandy loam which extends to below 60 inches.

The Shepan soils are slowly permeable. Effective depth is more than 40 inches. Available water capacity is moderately low to moderately high. Runoff is rapid, and the erosion hazard is high.

Representative profile of Shepan stony loam, is in an area of Humboldt County, Nevada approximately 22 miles southeast of Winnemucca at a site about 500 feet east of the apparent center of section 33, T. 33 N., R. 39 E. The surface is covered with about 1 percent stones and 40 percent gravel.

A1--0 to 6 inches, brown (10YR 5/3) stony loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many very fine interstitial pores; 40 percent gravel, 1 percent stones on surface; neutral (pH 7.0); clear smooth boundary. 4 to 8 inches thick.

B1--6 to 10 inches, brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak fine and very fine sub-anular blocky structure; slightly hard, friable, sticky, plastic; many very fine roots; many very fine interstitial pores; 20 percent gravel; neutral (pH 7.0); clear smooth boundary. 2 to 6 inches thick.

B1t--10 to 15 inches, brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; hard, friable, sticky, plastic; many very fine roots; common very fine tubular pores; common thin clay films as bridges and coats; 30 percent gravel, 10 percent cobbles; neutral (pH 7.0); abrupt wavy boundary. 4 to 8 inches thick.

B21t--15 to 32 inches, brown (10YR 5/3) gravelly clay, dark brown (10YR 3/3) moist; moderate fine angular blocky structure; hard, firm, very sticky, very plastic; common very fine roots; common very fine tubular pores; many moderately thick clay films on ped faces and in pores; 40 percent gravel, 10 percent cobbles; neutral (pH 7.0); abrupt wavy boundary. 10 to 18 inches thick.

B22t--32 to 42 inches, pale brown (10YR 6/3) cobbly clay, brown (10YR 4/3) moist; massive; hard, firm, very sticky, very plastic; few very fine roots; common very fine tubular pores; common thin clay films as bridges and coats; 40 percent cobbles, 10 percent gravel; neutral (pH 7.0); clear wavy boundary. 8 to 12 inches thick.

C1--42 to 63 inches, light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky, nonplastic; few very fine roots; common very fine tubular pores; 20 percent gravel; strongly effervescent; moderately alkaline (pH 8.4).

Thickness of the solum is 28 to 52 inches and depth to bedrock is greater than 40 inches. The A horizon has loam or silt loam textures with 20 to 40 percent gravel and has weak very fine granular structure or is massive. The B2t horizon has moderate or weak fine or very fine subangular or angular blocky structure. Textures are gravelly clay loam or gravelly clay with an average of 35 to 50 percent clay. It contains 30 to 40 percent gravel and 5 to 10 percent cobbles.

Shepan soils have been mapped only in Sonocan-Shepan association (80).

Shoken Series

The Shoken series are well drained soils formed in residuum from granite bedrock. They are on mountain hillsides at elevations of 4,800 to 5,600 feet. Slopes are 30 to 50 percent. The mean annual precipitation is 8 to 12 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 110 days. Vegetation is principally big sagebrush, rabbitbrush, desert peach, horsebrush, buckwheat, needlegrass, Indian ricegrass, and cheatgrass.

Typical Shoken soil profiles have two main parts: (1) brown cobbly coarse sandy loam about 5 inches thick; and (2) pale brown weathered granitic bedrock which grades to hard bedrock below 20 inches.

Shoken soils have rapid permeability. Effective depth is 3 to 10 inches. Available water capacity is low. Runoff is rapid, and the erosion hazard is high.

A representative profile of Shoken cobbly coarse sandy loam is in an area of Pershing County, Nevada, approximately 24 miles southeast of Winnemucca, about 500 feet north and 500 feet west of the southeast corner of section 6, T. 32 N., R. 39 E.

A1--0 to 5 inches, brown (10YR 5/3) cobbly coarse sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; few very fine roots; many very fine interstitial pores; 30 percent fine gravel, 15 percent cobbles; neutral (pH 7.0); abrupt wavy boundary. 3 to 10 inches thick.

C1--5 to 26 inches, pale brown (10YR 6/3) granitic saprolite, brown (10YR 4/3) moist; massive; hard and firm grading to very hard and very firm; few fine roots in cracks; clear wavy boundary. 15 to 30 inches thick.

R--26 to 31 inches, hard granite bedrock.

Depth to weathered bedrock is 3 to 10 inches. These soils are usually dry but are moist in the winter and spring months. Textures from the surface to the weathered bedrock average gravelly coarse sandy loam. It has 35 to 50 percent gravel or rock fragments. Depth to hard bedrock is 20 to 40 inches.

Shoken soils have been mapped only in Granyon-Shoken association (40).

Sonocan Series

The Sonocan series consists of well drained soils. They formed in residuum and colluvium from chert, quartzite, and slate. Slopes are 30 to 50 percent. The elevation is 5,200 to 6,600 feet where the mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is big sagebrush, Sandberg bluegrass, squirreltail, lupine, rabbitbrush, phlox and annual forbs.

Typical Sonocan soil profiles have three main parts: (1) a surface layer of brown very stony silt loam about 17 inches thick; (2) a yellowish brown gravelly clay loam or very gravelly clay about 27 inches thick; and (3) quartzite bedrock.

Sonocan soils have slow permeability. Effective depth is 20 to 40 inches. Available water capacity is low to moderately low. Runoff is rapid, and the erosion hazard is high.

Representative profile of Sonocan very stony silt loam is in Pershing County, Nevada approximately 25 miles southeast of Winnemucca, about 700 feet north and 800 feet west of the center of section 3, T. 32 N., R. 39 E. The surface is covered with about 0.2 percent stones and 40 percent gravel.

A11--0 to 4 inches, brown (10YR 5/3) very stony silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine platy structure; slightly hard, friable, slightly sticky, plastic; many fine and very fine roots; many very fine interstitial pores; 5 percent cobbles; 30 percent gravel; 0.1 percent stones on surface; moderately alkaline (pH 8.4); clear smooth boundary. 3 to 7 inches thick.

A12--4 to 17 inches, brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, plastic; many fine and very fine roots; common very fine tubular pores; 20 percent gravel; strongly alkaline (pH 8.6); clear smooth boundary. 10 to 17 inches thick.

B1t--17 to 27 inches, brown (10YR 5/3) cobbly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, sticky, plastic; common fine and very fine roots; common very fine interstitial and tubular pores; few thin clay films in pores; 40 percent cobbles; 20 percent gravel; strongly alkaline (pH 8.6); clear smooth boundary. 6 to 12 inches thick.

B21tca--27 to 38 inches, yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic; few very fine roots; few very fine tubular pores; few thin clay films in pores; 20 percent cobbles, 30 percent gravel which are undercoated with lime; slightly effervescent in matrix and strongly to violently effervescent on undersides of fragments; moderately alkaline (pH 8.4); clear smooth boundary. 9 to 14 inches thick.

B22tca--38 to 44 inches, light yellowish brown (10YR 6/4) very gravelly clay, yellowish brown (10YR 5/4) moist; massive; hard, firm, very sticky, very plastic; few very fine roots; few very fine tubular pores; common thin clay films in pores, and common cutans; 60 percnet gravel that has thin and moderately thick lime coats on undersides; very slightly effervescent in matrix, and strongly to violently effervescent on undersides of rock fragments; moderately alkaline (pH 8.4); abrupt wavy boundary. 6 to 10 inches thick.

R--44 to 45 inches, quartzite bedrock.

Thickness of the solum and depth to bedrock ranges from 40 to 60 inches. The mollic epipedon is 20 to 30 inches thick. The A horizon has moist chromas of 2 or 3. It has weak very fine platy or weak very fine granular or subangular blocky structure, and has 20 to 30 percent gravel. The B2t has values of 5 or 6 dry and 3, 4, or 5 moist, and

chroma of 3 or 4. Structure is moderate or weak, fine, very fine, and medium angular or subangular blocky. Gravel content is 40 to 60 percent. 20 to 40 percent cobbles may be found in some pedons. The clay content is 27 to 35 percent.

Sonocan-Shepan association (80).--This association occurs on steep, convex, upland slopes. It consists of about 45 percent Sonocan very stony silt loam, 30 to 50 percent slopes, and about 45 percent Shepan stony loam, 30 to 50 percent slopes. These soils have the profiles described as representative for their respective series. The Sonocan soils are on south and west facing slopes, and Shepan soils generally are on north and east slopes. Included are about 10 percent Gosumi, Nomara, and Golsum soils.

The vegetation on these soils is similar to that for their respective series. They have rapid runoff, and the erosion hazard is high..

This association is not suitable for irrigated cropland. They are used principally for rangeland and wildlife habitat.

Sonocan component: Land capability unit VIIs-239, dryland

Range site NV-24-13 Loamy, 10 to 12 inch precipitation zone

Wildlife suitability group --43, dryland.

Shepan component: Land capability unit VIIs-239, dryland

Range site NV-24-23 Upland north slope

Wildlife suitability group --42, dryland.

Sonoma Series

The Sonoma series consists of very deep, poorly drained soils. They formed in medium and moderately fine textured alluvium from mixed rocks. Slopes are less than 1 percent. They are on smooth, nearly level flood plains at elevations of 3,800 to 4,800 feet. The mean annual precipitation is 8 to 10 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 110 days. Vegetation is principally greasewood, fourwing saltbush, rabbitbrush, saltgrass, bluejoint wildrye, Basin wildrye, and baltic rush.

Typical Sonoma soil profiles have three main parts: (1) a surface layer of gray silt loam, 6 inches thick; (2) gray and light brownish gray silty clay loam, 14 inches thick; and (3) light yellowish brown silt loam to 67 inches.

Sonoma soils have moderately slow or slow permeability. Effective depth is 60 inches. Available water capacity is high. Runoff is slow, and the erosion hazard is slight.

A representative profile of Sonoma silt loam, slightly saline-alkali is in Humboldt County, Nevada approximately 4 1/2 miles northeast of Winnemucca, about 1,200 feet east and 1,500 feet north of the southwest corner of section 34, T. 37 N., R. 38 E.

A11--0 to 6 inches, gray (10YR 6/1) silt loam, very dark grayish brown (10YR 3/2) moist; moderate, coarse platy structure; hard, friable, slightly sticky, slightly plastic; many fine, medium and coarse roots; few fine and medium tubular and many fine interstitial pores; strongly effervescent; strongly alkaline (pH 8.8); clear smooth boundary. 3 to 9 inches thick.

A12--6 to 14 inches, gray (10YR 6/1) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic parting to weak coarse angular and subangular blocky

structure; hard, friable, sticky, plastic; many fine and medium roots; common fine and medium tubular and interstitial pores; strongly effervescent; strongly alkaline (pH 8.8); clear smooth boundary. 6 to 13 inches thick.

C1--14 to 20 inches, light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium granular structure; hard, friable, sticky, plastic; many fine and medium roots; common fine and medium tubular and interstitial pores; strongly effervescent; strongly alkaline (pH 9.0); clear irregular boundary. 4 to 8 inches thick.

C2--20 to 33 inches, variegated light gray (2.5Y 7/2) and light grayish brown (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) and dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky, plastic; common fine and medium roots; many fine and medium and few coarse tubular pores; many fresh water crustacean shells; strongly effervescent; strongly alkaline (pH 9.0); clear smooth boundary. 10 to 20 inches thick.

C3--33 to 67 inches, light yellowish brown (2.5Y 6/4) silt loam, dark yellowish brown (2.5Y 4/4) moist; massive; slightly hard, friable, slightly sticky, plastic; few fine roots; many fine and medium and few coarse tubular pores; many fresh water crustacean shells; few 1/4 to 1/2-inch diameter white (2.5Y 8/2) lime nodules; strongly effervescent; strongly alkaline (pH 8.6).

Sonoma soils are wet much of the time. Seasonally high water table is at 24 to 36 inches. Reaction is moderately to very strongly alkaline. Thickness of the A1 horizon ranges from 9 to 22 inches. Textures range from silt loam to silty clay. Textures of the 10 to 40 inch control section are dominantly silty clay loam or heavy silt loam with an average clay content of 25 to 35 percent. Occasional strata of silty clay are present in some profiles. The fresh water mollusk shells and lime nodules are lacking in some profiles.

Sonoma silt loam, slightly saline-alkali (81).--This soil is in irregularly shaped areas on smooth, nearly level flood plains. Typically they occur on slightly higher surfaces than the flood plain and, consequently, are usually saline-alkali. This soil has the profile described as representative for the soil series. Included are about 10 to 15 percent Humboldt, Rose Creek, and strongly saline-alkali Sonoma soils.

The vegetation is primarily rabbitbrush, saltgrass, Basin wildrye, bluejoint wildrye, and baltic rush. Runoff is slow, and the erosion hazard is slight. Seasonal high water table is at 2 to 3 feet. It is subject to occasional or rare flooding.

This soil is suitable for irrigated cropland if protected from flooding, and drained. It is used principally for native meadow or grass hay and pasture, rangeland, and wildlife habitat.

Land capability unit IIw-61, irrigated; VIs-221, dryland

Range site NV-24-8 Moist flood plain

Wildlife suitability group 1-2-I, irrigated; --22, dryland

Sonoma silt loam, strongly saline-alkali (82).--This soil occurs as rounded and oval shaped areas on smooth, nearly level flood plains. It is similar to the soil described for the series except it is at slightly higher elevations than the flood plain; the A1 horizons are slightly thinner, and it is strongly saline-alkali affected. Included are about 10 to 15 percent Humboldt, Rose Creek, and slightly saline-alkali Sonoma soils.

The vegetation is primarily greasewood, fourwing saltbush, and saltgrass. Runoff is slow, and the erosion hazard is slight. Seasonal high water table is at 2 to 3 feet. It is subject to occasional or rare flooding.

This soil is suited for irrigated cropland if drained and reclaimed. It is used principally for rangeland and wildlife habitat.

Land capability unit IIIw-61, irrigated; VIIw-221, dryland

Range site NV-24-7 Saline bottom

Wildlife suitability group 2-2-I, irrigated; --34 dryland

Spinlin Series

The Spinlin series consists of well drained soils. They formed in residuum and colluvium from quartzite, chert and rhyolite. Slopes are 4 to 30 percent. The elevation is 6,500 to 9,000 feet. The mean annual precipitation is 12 to 15 inches, mean annual air temperature is 35° to 40° F., and the frost-free season is 50 to 70 days. Vegetation is principally low sagebrush, rabbitbrush, lupine, hawksbeard, buckwheat, phlox, Idaho fescue, and Sandberg bluegrass.

Typical Spinlin soil profiles have three main parts: (1) a surface layer of grayish brown very stony silt loam about 6 inches thick; (2) brown and yellowish brown cobbly clay about 30 inches thick; and (3) yellowish brown saprolite weathered from quartzite and chert bedrock.

Spinlin soils have very slow permeability. Effective depth is 30 to 40 inches. Available water capacity is moderately low to moderately high. Runoff is medium to rapid, depending on slope, and the erosion hazard is moderate to high.

A representative profile of Spinlin very stony silt loam is in Pershing County, Nevada approximately 15 miles southeast of Winnemucca in the Sonoma Range, about 1,800 feet east and 900 feet north of the southwest corner of section 23, T. 34 N., R. 39 E. The surface is covered with 15 to 20 percent gravel and 5 to 10 percent stones.

A1--0 to 6 inches, grayish brown (10YR 5/2) very stony silt loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many very fine interstitial pores; 15 to 20 percent gravel and 5 to 10 percent stones; neutral (pH 6.8); clear wavy boundary. 4 to 10 inches thick.

B21t--6 to 16 inches, grayish brown (10YR 5/2) cobbly clay, dark brown (10YR 3/3) moist; moderate, very fine subangular blocky structure; hard, firm, very sticky, very plastic; common very fine roots; common very fine interstitial and tubular pores; many thin clay films on ped faces and in pores; 20 percent cobbles, 15 percent gravel; neutral (pH 6.8); abrupt wavy boundary. 9 to 15 inches thick.

B22t--16 to 24 inches, brown (10YR 4/3) cobbly clay, dark yellowish brown (10YR 3/4) moist; weak fine prismatic structure; very hard, firm, very sticky, very plastic; few very fine roots; common very fine tubular pores; many thin, few moderately thick clay films on ped faces and in pores; 20 percent cobbles, 15 percent gravel; neutral (pH 7.0); clear wavy boundary. 7 to 12 inches thick.

B23tca--24 to 36 inches, yellowish brown (10YR 5/4) cobbly clay, dark yellowish brown (10YR 4/4) moist, with many medium distinct lime mottles; weak fine angular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; few very fine interstitial and tubular pores; many thin clay films on ped faces and in pores; 25 percent cobbles, 15 percent gravel; strongly effervescent in matrix and violently effervescent in mottles with cobbles and pebbles lime coated; moderately alkaline (pH 8.4); abrupt wavy boundary. 10 to 18 inches thick.

C1--36 to 48 inches, yellowish brown (10YR 5/4) saprolite weathered from quartzite and chert bedrock; strongly effervescent; moderately alkaline (pH 8.4).

Thickness of the solum and depth to the underlying, weathered bedrock ranges from 30 to 40 inches. The A1 horizon has chroma of 2 or 3. The B2t horizons have an average clay content of 45 to 60 percent. Coarse fragments consist of 15 to 20 percent gravel and 20 to 30 percent cobbles and stones. Average depth to lime is 18 to 24 inches.

Spinlin-Panin association, sloping (83).--This association occurs as broad areas on mountain slopes of 4 to 15 percent. It consists of about 45 percent Spinlin very stony silt loam, and 40 percent Panin stony loam. These soils have the profiles described as representative for their respective series. The Spinlin soils are on west and south facing slopes, and Panin soils are on north and east facing slopes. Included are about 15 percent Dryn, Harcany, Percoun, Graley, Winada and Winevada soils.

Vegetation for these soils is similar to that described for their respective series. These soils have medium runoff, and a moderate erosion hazard.

This association is not suited for irrgated farming. They are used for rangeland and wildlife habitat.

Spinlin component: Land capability unit VIIs-214

Range site NV-24-16 Upland ridge

Wildlife suitability group --43, dryland

Panin component: Land capability unit VIs-214

Range site NV-24-27 High mountain loam

Wildlife suitability group --42, dryland

Spinlin-Panin association, moderately steep (84).--This association occurs as broad areas on moderately steep mountins. It consists of about 45 percent Spinlin very stony silt loam, and 40 percent Panin stony loam. These soils have profiles that are similar to that described for their series except they are on slopes of 15 to 30 percent. Spinlin soils are on west and south facing slopes, and Panin soils are on north and east facing slopes. Included are about 15 percent Dryn, Harcany, Percoun, Graley, Winada and Winevada soils.

Vegetation for these soils is similar to that described for their series. They have medium runoff, and a moderate erosion hazard.

This association is not suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Spinlin component: Land capability unit VIIs-214

Range site NV-24-16 Upland ridges

Wildlife suitability group --43, dryland

Panin component: Land capability unit VIs-214

Range site NV-24-27 High mountain loam

Wildlife suitability group --42, dryland

Sumine Series

The Sumine series consists of well drained soils. They formed in residual material and colluvium from quartzite, sandstone, and shale rock. Slopes are 50 to 70 percent. The elevation is 5,500 to 7,000 feet. Mean annual precipitation is 10 to 12 inches, mean annual air temperature is 40° to 45° F., and the frost-free season is 80 to 100 days. Vegetation is big sagebrush, low rabbitbrush, juniper, bluebunch wheatgrass, Sandberg bluegrass, and cheatgrass.

Typical Sumine soil profiles have three main parts: (1) a surface layer of brown extremely stony loam about 6 inches thick; (2) brown very gravelly clay loam about 22 inches thick; and (3) fractured quartzite bedrock.

Sumine soils have moderate permeability. Effective depth is 20 to 40 inches. Available water capacity is low to moderately low. Run-off is rapid, and the erosion hazard is high.

Representative profile of Sumine extremely stony loam is at a site about 2,400 feet west and 800 feet north of the southeast corner of section 14, T. 35 N., R. 38 E. The surface is covered with about 15 percent gravel, 10 percent cobbles, and 8 percent stones.

A11--0 to 3 inches, brown (10YR 5/3) extremely stony loam, dark brown (10YR 3/3) moist; weak very fine platy or weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 20 percent gravel; neutral (pH 6.8); clear smooth boundary. 2 to 5 inches thick.

A12--3 to 6 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine interstitial pores; 20 percent gravel neutral (pH 7.0); abrupt wavy boundary. 3 to 5 inches thick.

B1t--6 to 10 inches, brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, sticky, plastic; common fine and very fine roots; many very fine interstitial and common very fine tubular pores; 30 percent gravel; neutral (pH 7.2); clear wavy boundary. 4 to 8 inches thick.

B2t--10 to 24 inches, brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate very fine angular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; common very fine interstitial pores; 40 percent gravel, 5 percent cobbles; neutral (pH 7.2); abrupt wavy boundary. 5 to 15 inches thick.

B3t--24 to 28 inches, pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 4/3) moist; weak very fine angular blocky structure; hard, firm, very sticky, very plastic; many very fine interstitial pores; 40 percent gravel, 20 percent cobbles; neutral (pH 7.2); abrupt wavy boundary. 4 to 12 inches thick.

C1--28 to 32 inches, fractured quartzite bedrock with many moderately thick clay coatings on rock fragments and deposits in cracks.

Thickness of the solum and depth to the weathered bedrock ranges from 20 to 40 inches. The mean annual soil temperature ranges from 42° to 47° F., and the mean summer soil temperature is 59° to 64° F. They are noneffervescent and neutral throughout. Textures of the B2t horizons are dominantly clay loam but range to include loam and light clay. The weighted average clay content ranges from 25 to 35 percent. There are 40 to 60 percent coarse fragments in the Bt horizon.

Sumine-Pernty association (85).--This association occurs on steep upland slopes. It consists of about 55 percent Sumine extremely stony loam, 50 to 70 percent slopes, and about 30 percent Pernty very stony loam, 50 to 70 percent slopes. Sumine soils have a profile described as representative for the series. The profile for Pernty soils is similar to that described for the series except they are on steeper slopes. Sumine soils are on west and south facing mountain-side slopes, and Pernty soils are on the ridges between side slopes. Included are about 15 percent Golsum, Gosumi and Graley soils, and Rock outcrop.

The vegetation for these soils is similar to that described for their series. Sumine soils have rapid runoff,and the erosion hazard is high. They are especially subject to erosion from frost action. Pernty soils have very rapid runoff, and the erosion hazard is high.

This association is not suitable for irrigated cropland. They are used principally for rangeland and wildlife habitat.

Sumine component: Land capability unit VIIs-236, dryland

Range site NV-24-19 Semidesert juniper savannah

Wildlife suitability group --42, dryland.

Pernty component: Land capability unit VIIs-237

Range site NV-24-19 Semidesert juniper savannah

Wildlife suitability group --43, dryland.

Trunk Series

The Trunk series consists of moderately deep, well drained soils. They formed in residuum and colluvium from quartzite, chert, limestone, sandstone, shale, slate, and argillite. Slopes are 30 to 50 percent. They are on steep, convex mountain and foothill slopes at elevations of 4,500 to 6,000 feet. The mean annual precipitation is 8 to 10 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 120 days. Vegetation is principally rabbitbrush, horsebrush, spiny hopsage, big sagebrush, ephedra, cheatgrass, squirreltail, and hawksbeard.

Typical Trunk soil profiles have three main parts: (1) light brownish gray stony loam about 3 inches thick; (2) yellowish brown gravelly clay and gravelly clay loam about 27 inches thick; and (3) quartzite bedrock.

Trunk soils have very slow permeability. Effective depth is 22 to 38 inches. Available water capacity is moderately low to moderately high. Runoff is rapid, and the erosion hazard is high.

A representative profile of Trunk stony loam is in Pershing County, Nevada approximately 20 miles south of Winnemucca, about 1,000 feet north and 1,000 feet west of the southeast corner of section 11, T. 33 N., R. 38 E.

A1--0 to 3 inches, light brownish gray (10YR 6/2) stony loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; many very fine interstitial pores; 1 to 3 percent stones and cobbles, 25 percent gravel; neutral (pH 7.0); clear smooth boundary. 3 to 6 inches thick.

B21t--3 to 12 inches, yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; weak fine prismatic structure parting to strong very fine subangular blocky when disturbed; very hard, firm, sticky, plastic; common very fine and few fine and medium roots; common very fine and fine tubular pores; many thin and few moderately thick clay films on faces of peds and in pores; 15 percent gravel; neutral (pH 7.0); clear wavy boundary. 7 to 12 inches thick.

B22tca--12 to 20 inches, light yellowish brown (10YR 6/4) gravelly clay, yellowish brown (10YR 5/4) moist; very hard, firm, sticky, plastic; few very fine and fine roots; common very fine and fine tubular pores; 25 percent gravel; many fine distinct white (10YR 8/2) lime mottles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary. 6 to 10 inches thick.

B3tca--20 to 30 inches, light yellowish brown (10YR 6/4) gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; very hard, firm, sticky, plastic; few very fine roots; common very fine and few fine tubular pores; 35 percent gravel; many fine distinct white (10YR 8/2) lime mottles; violently effervescent; moderately alkaline (pH 8.4); abrupt irregular boundary. 6 to 12 inches thick.

R--30 to 33 inches, quartzite bedrock; has weathered pockets which can be dug with hand tools; bedrock fragments have lime coats and lime and clay in cracks.

Thickness of the solum and depth to the bedrock is 22 to 28 inches. The soils are usually dry during the summer and fall months, but moist from late winter through early spring. The mean annual soil temperature is 47° to 52° F. Depth to lime ranges from 9 to 17 inches. The lime impregnated B2tca and B3tca horizons are moderately or strongly alkaline. Texture of the B2t horizons is normally clay or gravelly clay but there are strata of clay loam in some profiles. Average clay content is 35 to 50 percent and average content of gravel is 15 to 35 percent.

Trunk-Pocan association (86).--This association occurs as large rectangular, triangular, and irregularly shaped areas on steep mountain and foothill slopes. It consists of about 45 percent Trunk stony loam, 30 to 50 percent slopes, and 40 percent Pocan stony loam, 30 to 50 percent slopes. These soils have the profiles described as representative for their respective series. Trunk soils are on south and west facing slopes, and Pocan soils are on north slopes. Included are about 15 percent Golsum, Graley, Adelaide, Golconda, and other Trunk-like soils which are shallow over bedrock.

Vegetation on the Trunk soils consists of rabbitbrush, horsebrush, spiny hopsage, big sagebrush, ephedra, cheatgrass, squirreltail, and hawksbeard. For Pocan soils it is big sagebrush, rabbitbrush, Sandberg bluegrass, squirreltail and phlox. These soils have rapid runoff, and a high erosion hazard.

This association is not suitable for use as irrigated cropland due to steep slopes. They are used principally for rangeland and wildlife habitat.

Trunk component: Land capability unit VIIs-239, dryland

Range site NV-24-5 Loamy, 8 to 10 inch precipitation zone

Wildlife suitability group --42, dryland.

Pocan component: Land capability unit VIIs-239

Range site NV-24-5 Loamy, 8 to 10 inch precipitation zone

Wildlife suitability group --42, dryland.

Valmy Series

The Valmy series consists of deep, well drained soils formed in alluvium from mixed rocks with an admixture of volcanic ash. They are on nearly level to moderately sloping alluvial terraces at elevations of 3,500 to 5,000 feet. Slopes are 0 to 8 percent. The mean annual precipitation is 6 to 8 inches, mean annual air temperature is 49° to 53° F., and the frost-free season is about 100 to 110 days. Vegetation is principally big sagebrush, rabbitbrush, spiny hopsage, horsebrush, greasewood, squirreltail, western wheatgrass, cheatgrass, mustards, bassia and Russian thistle.

Typical Valmy soil profiles have three main parts: (1) grayish brown and light gray fine sandy loam about 10 inches thick; (2) light gray and pale yellow fine sandy loam and sandy loam containing durinodes, about 33 inches thick; and (3) pale yellow and light brownish gray gravelly sand to 66 inches.

Valmy soils have moderately rapid permeability. Effective depth is more than 60 inches. Available water capacity is moderately high. Runoff is very slow, and the erosion hazard is slight to moderate.

A representative profile of Valmy fine sandy loam is in Humboldt County, Nevada approximately 3 miles northeast of Winnemucca and 1,000 feet north of Weso railroad maintenance station, about 1,000 feet east and 1,000 feet south of the apparent northwest corner of section 10, T. 36 N., R. 38 E.

A1--0 to 3 inches, grayish brown (10YR 5/2) micaceous fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; soft, very friable, non-sticky, nonplastic; many very fine, and few fine roots;

many very fine, and few fine tubular and many very fine interstitial pores; moderately alkaline (pH 8.4); abrupt smooth boundary. 2 to 4 inches thick.

C1--3 to 10 inches, light gray (10YR 7/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, very friable, nonsticky, nonplastic; many very fine, and few fine roots; many very fine, and few fine tubular and many micro interstitial pores; very strongly alkaline (pH 9.6); clear smooth boundary. 6 to 12 inches thick.

C2sica--10 to 12 inches, light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure; hard, friable, nonsticky, nonplastic; common very fine and few fine roots; many very fine interstitial, and few fine tubular pores; many (85 percent) very hard, firm, brittle durinodes; common thin silica films bridging sand grains, and few thin in pores; common fine and few medium horizontal lime seams and coatings; strongly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 0 to 4 inches thick.

C3ca--12 to 20 inches, light gray (2.5Y 7/2) fine sandy loam, high in ash content, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common very fine, and few fine roots; few very fine tubular and many very fine and micro interstitial pores; strongly effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. 7 to 12 inches thick.

C4sica--20 to 26 inches, light brownish gray (2.5Y 6/2) fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common very fine and fine roots; few very fine tubular and many very fine and micro interstitial pores; 5 percent 1 to 2-inch long, extremely hard, very firm, brittle durinodes that are olive brown (2.5Y 4/3) moist; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. 5 to 8 inches thick.

C5sica--26 to 37 inches, pale yellow (2.5Y 7/3) sandy loam, olive brown (2.5Y 4/4) moist; massive; hard, friable, nonsticky, nonplastic; few very fine roots; few very fine tubular and many micro interstitial pores; 45 percent 1 to 3-inch very hard, firm, brittle durinodes, and in pockets the entire mass is weakly silica-cemented; common thin silica films in pores and as bridges, and

as discontinuous, randomly oriented laminae; non-effervescent matrix and strongly effervescent on common fine white (10YR 8/2) lime seams; very strongly alkaline (pH 9.6); clear wavy boundary. 8 to 14 inches thick.

C6ca--37 to 43 inches, pale yellow (2.5Y 7/3) stratified fine sandy loam and gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; few very fine tubular, and many micro interstitial pores; 15 percent gravel; many fine faint white (10YR 8/2) lime filaments and coatings on base of gravel; slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. 5 to 9 inches thick.

IIC7--43 to 66 inches, light brownish gray (2.5Y 6/2) micaceous gravelly sand, olive brown (2.5Y 4/4) moist; single grained; loose; few very fine roots; many fine interstitial pores; 30 percent gravel; slightly effervescent; strongly alkaline (pH 9.0).

Valmy soils are usually dry, mainly in the summer and fall months, and moist in the winter and spring. Depth to the Csi horizons ranges from 8 to 20 inches. The 10 to 40 inch control section is fine sandy loam or sandy loam, but includes strata of very fine sandy loam or coarse sandy loam in some profiles. Some gravel, up to 30 percent, may be present in any one strata. Durinodes range from 5 to 85 percent by volume in any one horizon, but one or more horizons more than 6 inches thick contain more than 35 percent. Depth to the unconformable very gravelly or gravelly sand is commonly from 30 to 50 inches but is below 60 inches in some profiles.

Valmy fine sandy loam (87).--This soil occurs as broad, flat areas on alluvial fans and terraces. It has the profile described as representative for the soil series. Included are about 15 percent Valmy, Rad, and Weso soils.

The vegetation is primaily big sagebrush, rabbitbrush, spiny hopsage, squirreltail, and cheatgrass. Runoff is very slow, and the erosion hazard is slight.

This soil is suitable for irrigated cropland. Also, virgin areas are used for rangeland and wildlife habitat.

Land capability unit IIs-45, irrigated; VIc-220, dryland

Range site NV-24-22 Semidesert benchland

Wildlife suitability group 1-4-I, irrigated; --42, dryland.

Valmy fine sandy loam, saline-alkali (88).--This soil occurs as broad, rounded and oval shaped areas on alluvial terraces. This soil is similar to that described for the soil series except it is calcareous throughout, and is moderately to strongly saline-alkali affected. Included are about 10 to 15 percent Rad, Weso, and other nonsaline-alkali Valmy soils.

The vegetation is primarily greasewood, rabbitbrush, saltgrass, squirreltail, bassia and Russian thistle. Runoff is very slow, and the erosion hazard is slight.

This soil is suitable for irrigated cropland if it is reclaimed. It is used principally for rangeland and wildlife habitat.

Land capability unit IIs-46, irrigated; VIIs-221, dryland

Range site NV-24-22 Semidesert benchland

Wildlife suitability group 1-4-I, irrigated; --44, dryland

Valmy fine sandy loam, undulating (89).--This soil occurs as rounded and irregularly shaped areas on undulating terraces. The profile is similar to that described for the soil series except it is on slopes of 0 to 8 percent and has coarse sand and gravelly sand below 36 inches. Included are about 10 to 15 percent Blackhawk, Rad, Weso, and other saline-alkali Valmy soils.

The vegetation is primarily big sagebrush, spiny hopsage, horsebrush, squirreltail, western wheatgrass, cheatgrass, and mustards. Runoff is very slow, and the erosion hazard is moderate.

This soil is suited for irrigated cropland. It is used principally for rangeland and wildlife habitat.

Land capability unit IIIe-20, irrigated; VIc-220, dryland

Range site NV-24-22 Semidesert benchland

Wildlife suitability group 1-4-I, irrigated; --42, dryland

Weso Series

The Weso series consists of very deep, well drained, soils. They formed in alluvium and loess from mixed rock sources including some volcanic ash. Slopes are 0 to 8 percent. They are nearly level to moderately sloping alluvial fans and terraces at elevations of 4,000 to 5,000 feet. The mean annual precipitation is 6 to 8 inches, mean annual air temperature is 45° to 50° F., and the frost-free season is 100 to 120 days. The vegetation is mainly shadscale and bud sagebrush, with some greasewood, spiny hopsage, squirreltail, cheatgrass, and pepperweed.

Typical Weso soil profiles have three main parts: (1) light gray very fine sandy loam about 5 inches thick; (2) very pale brown fine sandy loam containing thin weakly cemented layers, about 21 inches thick; and (3) very pale brown stratified gravelly fine sandy loam, gravelly sandy loam, very gravelly loamy sand and some fine sandy loam extending to 65 inches.

Weso soils have moderate permeability. Effective depth is more than 60 inches. Available water capacity is moderately high to high. Runoff is slow, and the erosion hazard is slight to moderate.

A representative profile of Weso very fine sandy loam is in Humboldt County, Nevada approximately 2 miles northwest of Golconda, about 300 feet east and 150 feet south of the northwest corner of section 30, T. 36 N., R. 40 E.

The immediate surface has weakly developed octagonal cracks and a cover of many brown lichens. Tips of nipple-like growth of lichens are calcareous, the rest and the surface soil are noncalcareous.

A11--0 to 2 inches, light gray (10YR 7/2) very fine sandy loam, grayish brown (10YR 5/2) moist; weak medium platy structure; slightly hard, friable, nonsticky, very slightly plastic; few very fine roots; many very fine and few fine vesicular pores; moderately alkaline (pH 8.4); abrupt smooth boundary. 1 to 3 inches thick.

A12--2 to 5 inches, light gray (10YR 7/2) loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; hard, friable, slightly sticky, slightly plastic; common very fine and few fine roots; many very fine vesicular pores; moderately alkaline (pH 8.4); abrupt smooth boundary. 2 to 5 inches thick.

B2--5 to 11 inches, very pale brown (10YR 7/3) heavy fine sandy loam, brown (10YR 4/3) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and few fine tubular pores; moderately alkaline (pH 8.4); abrupt wavy boundary. 6 to 10 inches thick.

C1sica--11 to 16 inches, very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; few fine faint horizontal (10YR 8/2) lime filaments; weak thick platy structure; plates are weakly cemented by silica and are about 1/4 inch thick with slightly softer material between them; very hard, firm, nonsticky, slightly plastic; common very fine roots; many very fine tubular pores; many micro and many fine interstitial pores; slightly effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary. 4 to 7 inches thick.

C2sica--16 to 26 inches, very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; weak thick platy structure; hard, friable, slightly sticky, slightly plastic, with some lenses that are very hard and firm apparently silica-cemented; common fine faint white (10YR 8/2) lime streaks between plates; common very fine and fine roots; few very fine tubular and many micro and very fine interstitial pores; slightly effervescent in matrix, strongly effervescent on segregated lime; strongly alkaline (pH 9.0); clear wavy boundary. 8 to 15 inches thick.

IIC3--26 to 47 inches, very pale brown (10YR 7/3) gravelly fine sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many micro and very fine interstitial pores; 15 percent fine gravel; strongly

effervescent; strongly alkaline (pH 8.6); clear wavy boundary. 9 to 13 inches thick.

IIIC4--47 to 53 inches, very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; common very fine roots; many micro and many very fine interstitial pores; 60 percent gravel; slightly effervescent; moderately alkaline (pH 8.4); clear wavy boundary. 10 to 17 inches thick.

IIIC5--53 to 59 inches, very pale brown (10YR 7/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak thin platy structure; hard, slightly firm, nonsticky, nonplastic; few very fine roots; many very fine interstitial pores; 25 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary. 5 to 10 inches thick.

IVC6--59 to 65 inches, very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; few very fine roots; many very fine interstitial pores; 5 to 10 percent gravel; slightly effervescent; strongly alkaline (pH 8.6).

The solum is 10 to 18 inches thick. The 10 to 40 inch control section is dominantly fine sandy loam, very fine sandy loam or loam. There are strata of sandy loam, coarse sandy loam or silt loam in some profiles. Gravel and rock fragments range from 0 to 25 percent. Some profiles are underlain by gravel below 40 inches. Subhorizons in some profiles have durinodes in a friable matrix. The C horizons are slightly to violently effervescent and strongly to very strongly alkaline.

Weso loamy sand (90).--This soil occurs as small, rounded and rectangular areas on alluvial fans and terraces. It has a profile similar to that described for the series except it has loamy sand surface and it is on slopes of 4 to 8 percent. Included are about 10 to 15 percent Blackhawk, Rad, Valmy, and other Weso soils.

Runoff is slow, and the erosion hazard is slight to moderate.

This soil is poorly suited for irrigated cropland. It is used principally for rangeland for livestock, and as wildlife habitat.

Land capability unit VIIs-265

Range site NV-24-2 Desert loamy

Wildlife suitability group --43, dryland

Weso very fine sandy loam (91).--This soil occurs as large, irregularly shaped areas on alluvial fans and terraces with slopes of 0 to 2 percent. This soil has the profile described as representative for the series. Included are about 15 percent Blackhawk, Dun Glen, Valmy, and other Weso soils which are underlain by gravel below 40 inches.

The vegetation is shadscale, greasewood, squirreltail, and cheatgrass. Runoff is slow, and the erosion hazard is slight.

This soil is suitable for cropland if irrigation water becomes available. It is used principally for range for livestock.

Land capability unit IIc-1, irrigated; VIIc-240, dryland

Range site NV-24-2 Desert loamy

Wildlife suitability group 1-4-I, irrigated; --43, dryland

Weso very fine sandy loam, gravel substratum (92).--This soil occurs as large, irregularly shaped areas on alluvial fans and terraces. It has a profile similar to that described for the series except it is underlain by gravel below 40 inches, and it is on slopes of 2 to 4 percent. Included are about 15 percent Blackhawk, Dun Glen, Valmy, and other Weso soils.

The vegetation is shadscale, bud sagebrush, greasewood, squirreltail, and cheatgrass. Runoff is slow, and the erosion hazard is slight to moderate.

This soil is suited for irrigated cropland if water becomes available. It is used principally as range for livestock.

Land capability unit IIe-25, irrigated; VIIc-240, dryland

Range site NV-24-2 Desert loamy

Wildlife suitability group 1-4-I, irrigated; --43, dryland

Winada Seris

The Winada series consists of well drained soils. They formed in residual material and colluvium from quartz, grit, sandstone, shale, and limestone. Slopes are 50 to 70 percent. They occur at elevations of 7,000 to 9,000 feet. The mean annual precipitation is 12 to 15 inches, mean annual air temperature is 35° to 40° F., and the frost-free season is 50 to 80 days. Vegetation is low sagebrush, low rabbitbrush, currant, Idaho fescue, Sandberg bluegrass, gilia, lupine, astragalas, phlox, buckwheat, and skeletonweed.

Typical Winada soil profiles have three main parts: (1) a surface layer of grayish brown very stony loam about 10 inches thick; (2) brown or pale brown gravelly clay loam about 10 inches thick; and (3) sandstone bedrock at about 20 inches.

Winada soils have moderately slow permeability. Effective depth is 20 to 30 inches. Available water capacity is low. Runoff is very rapid, and the erosion hazard is high.

A representative profile of Winada very stony loam is in Humboldt County, Nevada approximately 7 miles southeast of Winnemucca, about 1,700 feet east of the southwest corner of section 17, T. 35 N., R. 39 E. The surface is covered with 15 to 20 percent gravel, 4 to 8 percent cobbles, 2 to 4 percent stones, and less than 1 percent boulders and rock outcrop.

A11--0 to 5 inches, grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; strong, medium granular structure; slightly hard, friable, nonsticky, nonplastic; many very fine and fine roots; many very fine interstitial pores; 60 percent gravel; neutral (pH 7.0); clear wavy boundary. 4 to 6 inches thick.

A12--5 to 10 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate coarse granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine interstitial pores; 40 percent gravel; neutral (pH 7.0); clear wavy boundary. 4 to 6 inches thick.

B2t--10 to 21 inches, pale brown (10YR 6/3) gravelly clay loam, brown (10YR 4/3) moist; moderate fine to medium subangular blocky structure; hard, friable, sticky, plastic; common very fine and fine roots; common very fine tubular pores; common thin clay films on ped faces and in pores; 40 percent gravel; neutral (pH 7.0); abrupt irregular boundary. 4 to 8 inches thick.

Cr--21 to 36 inches, pale brown (10YR 6/3) fractured sandstone bedrock with clay coatings on rock fragments and deposits in cracks; undersides of rock fragments lime coated; neutral (pH 7.0).

Thickness of solum and depth to the bedrock ranges from 20 to 30 inches. The mean annual soil temperature ranges from 36° to 41° F., and the mean summer soil temperature is 54° to 59° F. Structure of the A1 horizon is moderate or strong, medium or coarse, granular or crumb. Consistence is soft or slightly hard. The B2t horizons have hue of 10YR, value of 5 or 6 dry and 3 or 4 moist, and chroma of 3 or 4. Textures are gravelly clay loam with weighted average clay content of 28 to 35 percent, and 35 to 50 percent coarse fragments. Structure is moderate or strong, fine or medium subangular blocky. The solum is free from lime and neutral in reaction. The bedrock is fractured and has clay deposits in the cracks. There are also lime coatings on the underside of rock fragments.

Winada soils have been mapped only in Dryn-Winada association (24).

Winevada Series

The Winevada series consists of well drained soils. They formed in residual material and colluvium from argillite, slate, andesite, and quartzite. Slopes are 50 to 70 percent. They occur at elevations of 6,500 to 8,000 feet. The mean annual precipitation is 12 to 15 inches, mean annual air temperature is 35° to 40° F., and the frost-free season is 50 to 70 days. Vegetation is big sagebrush, snowberry, currant, Great Basin wildrye, cheatgrass, wyethia, balsamroot, and lupine.

Typical Winevada soil profiles have two main parts: (1) a thick surface layer of brown stony loam which grades to gravelly silt loam about 35 inches thick; and (2) quartzite bedrock.

Winevada soils have moderate permeability. Effective depth is 20 to 40 inches. Available water capacity is low to moderately low. Runoff is rapid, and the erosion hazard is high.

Representative profile of Winevada stony loam is in Humboldt County, Nevada approximately 6 miles southeast of Winnemucca, about 1,300 feet east and 1,800 feet south of the northwest corner of section 18, T. 35 N., R. 39 E. The surface is covered with about 12 percent gravel, 2 percent cobbles, and 1 percent stones. About .1 percent of the surface is rock outcrop.

A11--0 to 3 inches, brown (10YR 4/3) stony loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; 25 percent gravel; neutral (pH 6.8); clear wavy boundary. 2 to 4 inches thick.

A12--3 to 11 inches, brown (10YR 4/3) gravelly silt loam, dark brown (10YR 3/3) moist; massive; hard, very friable, slightly sticky, slightly plastic; many very fine roots; many very fine interstitial pores; 40 percent gravel; neutral (pH 6.8); clear wavy boundary. 5 to 9 inches thick.

A13--11 to 35 inches, brown (10YR 4/3) gravelly silt loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and few fine and medium roots; many very fine interstitial and few very fine tubular pores; 25 percent gravel; neutral (pH 6.8); abrupt irregular boundary. 12 to 30 inches thick.

C1--35 to 48 inches, light yellowish brown (10YR 6/4) fractured quartzite bedrock.

Thickness of the solum and depth to bedrock ranges from 20 to 40 inches. The soil is neutral in reaction and noncalcareous throughout. The mean annual soil temperature ranges from 36° to 41° F., and the mean summer soil temperature is 54° to 59° F. The texture of the 10 to 40 inch control section is gravelly silt loam or loam. The weighted average clay content ranges from 18 to 25 percent and there are 10 to 30 percent coarse fragments by volume in the control section.

Winevada soils have been mapped only in Harcany-Winevada association (41).

USE AND MANAGEMENT OF THE SOILS

In this section, general soil management practices, saline-alkali soils and their management, and capability groups of soils in the Sonoma Planning Unit are discussed.

General Management Practices

The irrigated soils of the Sonoma Planning Unit are used chiefly to produce forage and feed crops for livestock, and small grains. Alfalfa is grown for both hay and seed. Potatoes have been grown to a minor extent, and may become a major crop.

Crop rotations are not rigidly followed. In the flood plains along Humboldt River and other streams, native grass meadow is maintained as a permanent crop. It is chiefly harvested as hay, but some acreage is used for permanent pasture. In the better drained soils, alfalfa is the principal crop grown. Stands are kept an indefinite number of years without rotation. Normally, alfalfa is plowed out and crops rotated only when the stand becomes too thin to produce a satisfactory yield or quality of hay or seed. Small grain, usually wheat or barley, is then grown for one or two years before alfalfa is reestablished.

The Humboldt River and other streams normally provide an excess of water during the spring months. By summer the flow dwindles until it is no longer adequate for further irrigation. Use is made of these waters while the flow is high to irrigate the native meadows by controlled flooding. Controlled flooding consists of using dams and distribution ditches to control the water and flood it over the land surface. When the soil becomes saturated the excess water flows off

and back into the streams from which it originated. This system is very inefficient as it pertains to use of water. However, since there is normally an excess of water, ranch operators are not as concerned about efficient use of water as about time and labor. This system of irrigation requires only a small amount of time and labor to operate.

On other soil, water is pumped from deep wells for irrigation. The cost of pumping is high, making water expensive. Conservation and efficient use of these waters is a major concern. Border and furrow irrigation are common systems used. Border irrigation consists of applying water to strips of land of various widths. The strips are separated by low dikes often referred to as border ridges. The water floods over the surface between the ridges and is controlled by the ridges. The water advances slowly down the strip and wets the soil. Border irrigation is suitable on fields with close-growing crops. Furrow irrigation consists of applying water in small streams in trenches or furrows a few inches wide and a few inches deep. As the water advances down the furrow it wets the soil. Water soaks laterally between furrows as well as downward through the soil until the area between furrows is wetted. Irrigation by sprinkling is also a common practice.

Irrigation water is one of the most valuable resources in this area. Its greatest benefit depends on its efficient use, which should be based on a careful consideration of soil characteristics and other features of the land. A good system for conservation irrigation applies

water to the soil in the amount needed for optimum growth of the crop, at the time needed by the crop, with as little water as possible, and without causing erosion.

Saline-Alkali Soils

Some soils in the area contain high concentrations of soluble salts and alkali. These soils require special management when used for crop production. Fortunately, alfalfa, the principal crop grown, is salt and alkali tolerant. Alfalfa can be established and maintained on moderately to strongly saline-alkali soils by leaching of salts. If the soils are also affected by a seasonal high water table, salt and alkali-tolerant grasses should be used.

Special management is usually required to establish a crop on saline-alkali affected soils. Salts in the soil reduce the available water capacity of a soil due to increased osmotic pressure. Alkali causes soils to disperse and reduces permeability. Many of these soils tend to bake and form a hard crust on the surface as they dry. When establishing a crop the soil should be dept moist to provide adequate moisture for germination and to prevent crusting of the surface. When the surface becomes crusted seedlings cannot break through and they die. To keep the soil adequately wet, therefore, requires frequent, light irrigations. The frequency of irrigations can be reduced if the soil is covered with a mulch of straw or other organic material which will reduce the rate of drying and crusting.

After the crop is established an excess of irrigation water, beyond the needs of the crop, should be used to flush the excess salts out of the soil and into the drainage water.

Some saline-alkali affected soils can be reclaimed or at least improved simply by growing a crop and using excess water to leach the salts. This is true of soils with permeable profiles and adequate drainage.

If soils lack drainage, or if they have slow or very slow permeability, reclamation of saline-alkali soils or improvement of these is more difficult. On soils lacking drainage it must be established. This is difficult on some soils since the land where they occur is so flat there is no outlet for drainage effluent.

Reclamation of saline-alkali affected soils requires percolation of water through the soil at a rate sufficiently rapid to flush out soluble salts. Water will not percolate through slowly or very slowly permeable soils rapidly enough to satisy this requirement. Slowly or very slowly permeable soils, therefore, are very difficult to reclaim or improve. Reclamation normally is not considered feasible on these soils.

Reclamation of saline-alkali affected soils can be done more rapidly by using soil amendments such as gypsum or sulfur. For these amendments to be effective it is essential that the soils have drainage. If soils lack adequate drainage, a drainage system should be installed. Soil tests should be made to determine the degree of alkali and quantity of amendment required. The amendment is normally applied on the surface and disced or plowed into the surface 7 inches. Irrigation water is applied to dissolve the amendment and carry it through the soil. A chemical reaction occurs in which calcium dissolved in the soil water replaces sodium in the soil and the sodium is then flushed out in the

drainage effluent. The exchange of calcium for sodium in the soil changes it from an alkali soil to a nonalkali soil.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or engineering.

In the capability system, all kinds of soils are grouped at three levels; the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitation that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by w, s, and c, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding Arabic numerals to the subclass symbols, for example, IIe-20 or IIIe-21. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numerals specifically identified the capability unit within each subclass.

In the following pages the capability units in the Sonoma Planning Unit are described and suggestions for the use and management of the soils are given.

Management by capability units

For many of the soils in the Sonoma Planning Unit, a system of dual crop capability classification is used. The climate is semi-arid to arid making irrigation necessary if soils are used to produce domestic crops. Irrigation water is not available for all the soils which otherwise would be suitable for crop production. Soils having a potential for crop production under irrigation are classified both as irrigated cropland and as dryland. Soils with no potential for cropland are classified as dryland, only.

The frost-free season, based on 32° F. minimum temperature, is less than 130 days. This affects the capability classification since choice of crops is limited by length of growing season.

In the virgin condition, soils in this survey area are normally deficient in plant nutrients and organic matter. Also when virgin land is converted to cropland, land leveling or smoothing is usually necessary.

In table 2 capability units are rated for their suitability for crop production. They are rated as having good, fair, or poor suitability on the basis of properties of the soils which they contain as follows:

Soil property	Good	Fair	Poor
Inherent fertility	High	Medium	Low
Available water capacity	High	Medium	Low
Wetness	Well drained	Moderately well drained	Somewhat poorly or poorly drained
Salinity and alkali	Free	Low	Moderate
Soil depth	> 40 inches	20-40 inches	< 20 inches
Slope	< 4 percent	4 to 8 percent	> 8 percent
Potential yield of crops	High	Medium	Low

Table 2.--Crop Suitability by Capability Units

Sonoma Planning Unit, Nevada

Capability unit	Suitability for -----					
	Alfalfa hay	Alfalfa seed	Wheat	Barley	Potatoes	Pasture
IIc-1	Good	Good	Good	Good	Good	Good
IIe-20	Good	Good	Good	Good	Good	Good
IIe-25	Good	Good	Good	Good	Good	Good
IIw-61	Fair	Poor	Good	Good	Fair	Good
IIs-45	Good	Good	Good	Good	Good	Good
IIs-46	Good	Good	Good	Good	Fair	Good
IIIe-21	Fair	Fair	Fair	Fair	Fair	Fair
IIIw-60	Poor	Poor	Poor	Poor	Poor	Good
IIIw-61	Fair	Fair	Fair	Fair	Poor	Good
IIIw-64	Fair	Fair	Poor	Fair	Poor	Fair
IIIs-45	Fair	Fair	Good	Good	Fair	Good
IVe-21	Poor	Poor	Fair	Fair	Poor	Fair
IVe-25	Fair	Fair	Fair	Fair	Fair	Fair
IVw-61	Poor	Poor	Poor	Poor	Poor	Good
IVw-64	Poor	Poor	Poor	Poor	Poor	Fair
IVw-68	Poor	Poor	Poor	Poor	Poor	Fair
IVs-40	Poor	Poor	Fair	Fair	Poor	Fair
IVs-41	Poor	Poor	Fair	Fair	Poor	Fair
IVs-43	Poor	Poor	Poor	Poor	Poor	Poor
IVs-48	Poor	Poor	Poor	Poor	Poor	Fair
IVs-53	Poor	Poor	Fair	Fair	Poor	Fair

CAPABILITY UNIT IIe-20, IRRIGATED

This unit consists of deep, well drained, loamy soils on gently sloping alluvial fans and terraces with slopes of 2 to 4 percent. Surface textures are loams, very fine sandy loams, and fine sandy loams. Subsoil textures may be somewhat stratified and include loam, very fine sandy loam, fine sandy loam and sandy loam. Some soils in this unit have gravelly lenses within the profile and others are gravelly throughout. Some soil profiles contain durinodes in one or more horizons. The mean annual precipitation ranges from 6 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability ranges from moderately slow to moderately rapid. Runoff is slow and the erosion hazard is moderate. Available water capacity is high. The effective rooting depth is more than 60 inches.

These soils are used for irrigated cropland. They have slight limitations imposed by length of growing season and slope.

Desirable management practices on these soils to offset or minimize limitations and to maintain crop productivity are: use of crops adapted to the growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIe-25, IRRIGATED

This unit consists of deep, well drained loamy soils on gently sloping alluvial fans and terraces with slopes of 2 to 4 percent. Surface textures are very fine sandy loam. Subsoil textures may be somewhat stratified and include very fine sandy loam and sandy loam. These soils are underlain by gravel below 36 inches. The mean annual precipitation ranges from 6 to 8 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately slow due to weak cementing with silica in the subsoil. Runoff is slow, and the erosion hazard is moderate. Available water capacity is moderately high. Effective rooting depth is more than 60 inches.

The soils in this unit are suitable for irrigated cropland. They have slight limitations imposed by length of growing season, slope and limited available water capacity.

Desirable management practices on these soils to offset or minimize limitations and to maintain crop production are: use of crops adapted to the growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIw-61, IRRIGATED

This unit consists of deep, somewhat poorly drained soils on nearly level flood plains with slopes of 0 to 2 percent. Surface textures are silt loam. Subsoil and substrata textures are silt loam and silty clay loam. The mean annual precipitation ranges from 6 to 9 inches. The frost-free season is 100 to 120 days.

Permeability is moderately slow. Runoff is slow, and the erosion hazard is slight. Available water capacity is high. Effective rooting depth is more than 60 inches.

These soils are suitable for irrigated cropland with slight limitations imposed by length of growing season, saline-alkali conditions and wetness.

Desirable management practices on these soils to offset or minimize limitations and to maintain crop production are: use of crops adapted to the growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIs-45, IRRIGATED

This unit consists of deep, well drained loamy soils on gently sloping alluvial fans and terraces with slopes of 0 to 2 percent. Surface textures are loam, and subsoil textures are very fine sandy loam and fine sandy loam. They are underlain by gravel at 40-inch depth. The mean annual precipitation rages from 6 to 8 inches, and the frost-free season is 100 to 120 days.

The permeability is moderate. Runoff is slow, and the erosion hazard is slight. Available water capacity is moderately high, and effective rooting depth is more than 60 inches.

These soils are suitable for irrigated cropland. They have slight continuing limitations imposed by length of growing season and limited available water capacity.

Desirable management practices on these soils to offset or minimize limitations and to maintain crop production are: use of crops adapted to the growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure; tilth, and help infiltration of water.

CAPABILITY UNIT IIs-46, IRRIGATED

This unit consists of deep, well and moderately well drained soils on nearly level alluvial fans, terraces and flood plains with 0 to 2 percent slopes. Surface textures are silt loam, very fine sandy loam, and fine sandy loam. Subsoil and substrata textures range from gravelly sand to silty clay loam and include sandy loam, fine sandy loam, very fine sandy loam, and silt loam. Some subhorizons in some of these soils are weakly cemented with silica and others contain durinodes. The mean annual precipitation ranges from 6 to 9 inches, and the frost-free season is 100 to 120 days.

Permeability ranges from moderately slow to moderately rapid. The runoff is very slow or slow, and the erosion hazard is slight. Available water capacity is moderately high to high, and effective rooting depth is more than 60 inches.

These soils are suitable for irrigated cropland with continuing slight limitations imposed by length of growing season and saline-alkali conditions.

Desirable management practices on these soils to offset or minimize these limitations are: crops adapted to the growing season and to the saline-alkali condition; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIc-1, IRRIGATED

This unit consists of deep, well drained loamy soils on nearly level alluvial fans, terraces or flood plains with slopes of 0 to 2 percent. Surface textures are loam, very fine sandy loam, and fine sandy loam. Subsoil textures may be somewhat stratified and include loam, very fine sandy loam, fine sandy loam, and sandy loam. Some soils in this unit have gravelly lenses within the profile and others are gravelly throughout. Some soils contain durinodes in one or more subhorizons. The mean annual precipitation ranges from 6 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability ranges from moderately slow to moderately rapid. Runoff is slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

These soils are used primarily for irrigated cropland. They have a slight limitation imposed by the length of growing season.

Desirable management practices on these soils to offset or minimize these limitations are: crops adapted to the length of growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIIe-20, IRRIGATED

This unit consists of deep, well drained loamy soils on undulating alluvial fans and terraces with slopes of 0 to 8 percent. Surface textures are fine sandy loam, and subsoil textures are very fine sandy loam and fine sandy loam. These soils may be underlain by gravel at 40-inch depth. The mean annual precipitation ranges from 6 to 8 inches and the frost-free season is 100 to 120 days.

Permeability is moderate. Runoff is slow, and the erosion hazard is slight. Available water capacity is moderately high. Effective rooting depth is more than 60 inches.

These soils are suitable for irrigated cropland. They have moderate limitations imposed by length of growing season, limited available water capacity, and undulating topography which may require sprinkler irrigation.

Desirable management practices on these soils to offset or minimize limitations and to maintain crop production are: use of crops adapted to the growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIIe-21, IRRIGATED

This unit consists of moderately deep, well drained soils on gently to moderately sloping alluvial fans and terraces with slopes of 2 to 8 percent. Surface textures are fine sandy loam and very fine sandy loam, and subsoil textures are very fine sandy loam or silt loam. These soils are underlain at depths of 20 to 36 inches by strongly cemented hardpans. The mean annual precipitation ranges from 8 to 10 inches, and the frost-free season is 100 to 120 days.

These soils have moderate permeability. Runoff is slow to medium depending on slope. The erosion hazard is slight to moderate. Available water capacity is moderately low to moderately high, and effective rooting depth is 20 to 36 inches.

These soils are suitable for irrigated cropland with limitations imposed by slope and restricted depth. Choice of crops, available water capacity and land leveling cuts are limited due to soil depth.

Desirable management practices to offset or minimize limitations and maintain crop production on these soils are: proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIIw-60, IRRIGATED

This unit consists of deep, poorly drained soils on nearly level flood plains with slopes of 0 to 2 percent. Surface textures are silty clay loam and loam. Subsoil textures may be somewhat stratified and include silty clay loam, silt loam, loam, very fine sandy loam and fine sandy loam. Some of these soils are underlain below 30 inches by loamy fine sands and fine sands. The mean annual precipitation ranges from 7 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately slow to moderate. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

The soils of this unit are suitable for irrigated cropland with severe limitations imposed by wetness. Drainage of these soils is not possible or is extremely difficult because outlets are not readily availabe. These soils are used primarily for native meadow hay or pasture.

Desirable management practices to offset or minimize limitations and maintain crop production are: proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIIw-61, IRRIGATED

This unit consists of deep, moderately well and somewhat poorly drained soils on nearly level alluvial fans, terraces and flood plains with 0 to 2 percent slopes. Surface textures are silt loams. Subsoil and substrata textures may be somewhat stratified and include fine sandy loam and silty clay loam. Some subhorizons in some of these soils are weakly cemented with silica and others contain durinodes. The mean annual precipitation ranges from 7 to 9 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately slow. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is moderately high to high, and effective rooting depth is more than 60 inches.

These soils are suitable for irrigated cropland with continuing limitations imposed by saline-alkali conditions.

Desirable management practices to offset or minimize limitations on these soils are: use of crops adapted to moderate saline-alkali conditions; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIIw-64, IRRIGATED

This unit consists of deep, moderately well drained soils on nearly level terraces and alluvial fans with slopes of 0 to 2 percent. Surface textures are silt loam or very fine sandy loam, and the subsoil is silt loam. These soils are usually underlain by lake sediments of silty clay loam at 30 to 40-inch depth. The mean annual precipitation ranges from 7 to 9 inches, and the frost-free season is 100 to 110 days.

These soils have slow permeability. Runoff is very slow, and the erosion hazard is slight. Available water capacity is moderately high to high, and the effective rooting depth is more than 60 inches.

These soils are suitable for use as irrigated cropland with continuing limitations imposed by slight wetness, saline-alkali conditions, and slow permeability.

Desirable management practices to offset or minimize the limitations on these soils and maintain crop production are: use of crops adapted to the growing season and saline-alkali conditions; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IIIs-45, IRRIGATED

This unit consists of deep, well and somewhat excessively drained soils on nearly level alluvial fans and terraces with slopes of 0 to 2 percent. They have fine sandy loam and loam surface and subsoil textures. The subsoils are underlain at depths of 10 to 24-inch depth by stratified gravelly and very gravelly sandy loams and sands. The mean annual precipitation ranges from 4 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability is moderate to moderately rapid. Runoff is slow, and the erosion hazard is slight. Available water capacity is moderately low to moderately high. Effective rooting depth is more than 60 inches.

The soils in this unit are suitable for irrigated cropland with moderate limitations imposed by limited available water capacity.

Desirable management practices on these soils to offset or minimize limitations and to maintain crop production are: use of crops adapted to the length of growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IVe-21, IRRIGATED

This unit consists of shallow, well drained soils on gently to moderately sloping alluvial fans and terraces with slopes of 0 to 8 percent. The soils have essentially the same textures in the surface and subsoil including silt loam, very fine sandy loam, loam, and fine sandy loam. They are underlain at 10 to 20 inches depth by strongly cemented hardpans. The soils of the Adelaide series included in this unit have buried B2t horizons with clay loam or clay textures underlying the hardpans. The mean annual precipitation ranges from 6 to 10 inches, and the frost-free season is 100 to 130 days.

Permeability of these soils ranges from moderate to very slow. Runoff is slow to rapid depending on slope. The erosion hazard is slight to high. Available water capacity is low to moderately low, and effective rooting depth is 10 to 20 inches.

The soils in this unit are suitable for irrigated cropland with severe limitations imposed by slope and shallow depth.

Desirable management practices to offset or minimize limitations and maintain crop production are: use of crops adapted to shallow depth; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water. Chiseling or ripping of shallow hardpan layers will be a desirable practice to increase the depth available for rooting and available water capacity.

CAPABILITY UNIT IVe-25, IRRIGATED

This unit consists of deep, somewhat excessively drained soils on moderately sloping alluvial fans and terraces with slopes of 4 to 8 percent. The soils have essentially the same textures in the surface and subsoil which include gravelly fine sandy loam and gravelly loam. They are underlain by stratified very gravelly sandy loam, very gravelly sand, and gravelly loam at depths of 10 to 20 inches. The mean annual precipitation is 7 to 10 inches, and the frost-free season is 100 to 120 days.

These soils have moderately rapid permeability. Runoff is moderately rapid to rapid, and the erosion hazard is moderate to high. Available water capacity is low, and effective rooting depth is more than 60 inches.

These soils are suitable for use as irrigated cropland with severe limitations imposed by slope and low available water capacity. Erosion is a hazard due to slope.

Desirable management practices to offset or minimize limitations and maintain crop production are: use of crops adapted to the growing season; proper irrigation to provide for water control and efficient irrigation; fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, and tilth.

CAPABILITY UNIT IVw-61, IRRIGATED

This unit consists of deep, poorly drained, saline soils on nearly level flood plains with 0 to 2 percent slopes. Textures throughout the profiles are silty clay loam and silt loam with some stratification in the subsoil and substrata. The mean annual precipitation is 5 to 8 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately slow. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

These soils are suitable for use as irrigated cropland with continuing severe limitations imposed by a combination of poor drainage and saline-alkali conditions. These soils are on nearly level flood plains where outlets for drainage are difficult to establish.

Desirable management practices on these soils to offset or minimize limitations are: use of crops adapted to wetness and saline-alkali conditions, proper water management, toxic salt reduction and protection from flooding.

CAPABILITY UNIT IVw-64, IRRIGATED

This unit consists of deep, moderately well and poorly drained soils on nearly level terraces, alluvial fans, and flood plains on slopes of 0 to 2 percent. Surface texture is silty clay loam. Subsoil textures are silty clay loam, silty clay or clay. Some of these soils are underlain by very fine sandy loam below 40 inches depth. The mean annual precipitation ranges from 6 to 10 inches. The frost-free season is 100 to 120 days.

These soils have slow permeability. Runoff is very slow and the erosion hazard is slight. Available water capacity is moderate, and effective rooting depth is more than 60 inches.

The soils of this unit are suitable for use as irrigated cropland with continuing severe limitation imposed by wetness, saline-alkali conditions, and slow permeability. These soils are on nearly level slopes where drainage outlets are difficult to establish.

Desirable management practices to offset or minimize limitations and maintain crop production on these soils are: use of crops adapted to saline-alkali conditions and wetness; proper irrigation to provide for water control and efficient irrigation; toxic salt reduction; and fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IVw-68, IRRIGATED

This unit consists of deep, poorly drained, fine textured slightly saline soils on nearly level flood plains with 0 to 2 percent slopes. Surface textures are silty clay and the subsurface is silty clay, silty clay loam and clay. The mean annual precipitation is 5 to 8 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately slow. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

These soils are used primarily for native meadow hay and pasture. Their suitability for cropland is severely limited by fine surface texture, poor drainage and slight to moderate saline-alkali conditions. Drainage on these soils is extremely difficult to establish because outlets are not readily available.

Desirable management practices to offset or minimize limitations and maintain productivity on these soils are: use of plants adapted to wetness and saline-alkali conditions; proper cultivation when soils are not excessively wet; and salt reduction.

CAPABILITY UNIT IVs-40, IRRIGATED

This unit consists of shallow, well drained soils on nearly level alluvial fans and terraces with slopes of 0 to 2 percent. The soils have essentially the same textures in the surface and subsoil which includes silt loam, very fine sandy loam and loam. They are underlain at 10 to 20 inches depth by strongly cemented hardpans. The hardpans are underlain by buried B2t horizons with clay loam or clay textures. The mean annual precipitation ranges from 6 to 10 inches, and the frost-free season is 100 to 130 days.

These soils have very slow permeability. Runoff is slow, and the erosion hazard is slight. Available water capacity is low, and the effective rooting depth is 10 to 20 inches.

These soils are suitable for use as irrigated cropland with severe limitations imposed by shallow depth.

Desirable management practices to offset or minimize limitations and maintain crop production are: use of plants adpated to shallow soils; proper irrigation to provide for water control and efficient irrigation; and fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IVs-41, IRRIGATED

This unit consists of deep, well drained soils on nearly level terraces with slopes of 0 to 2 percent. Surface textures are silt loam and the subsoil is silty clay loam. The subsoils are underlain by lacustrine sediments of silty clay textures at depths of 4 to 15 inches. The mean annual precipitation is 6 to 9 inches, and the frost-free season is 100 to 120 days.

These soils have very slow permeability. Runoff is very slow and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

These soils are suitable for use as irrigated cropland with severe limitations imposed by very slow permeability.

Desirable management practices to offset or minimize limitations and maintain production are: use of plants adapted to the length of the growing season; proper irrigation to provide for water control and efficient irrigation; and fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IVs-43, IRRIGATED

This unit consists of deep, somewhat excessively drained sandy soils which formed in wind-deposited dunes or lake-shore terraces on slopes of 0 to 15 percent. Surface textures are fine sands and loamy fine sand. Subsoils may be somewhat stratified fine sand and loamy fine sands, and some fine sandy loam or very fine sandy loam. Some of these soils have durinodes in deeper layers. The mean annual precipitation is 6 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately rapid. Runoff is very slow or nonexistent. Water from precipitation normally infiltrates the soil as rapidly as it falls. The wind erosion hazard is high. Available water capacity is low to moderate, and the effective rooting depth is more than 60 inches.

These soils are suitable for use as irrigated cropland with severe limitations due to coarse surface textures. Sprinklers may be the best method of irrigation on these soils. The soil should be protected by continuous vegetative cover to avoid severe wind erosion.

Desirable management practices to offset or minimize limitations on these soils are: use of plants adapted to the length of growing season; proper irrigation to provide for water control and efficient irrigation; and fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IVs-48, IRRIGATED

This unit consists of deep, well drained soils on nearly level terraces with slopes of 0 to 2 percent. Surface texture is fine sand. Subsoil and substrata are silty clays of lacustrine origin. The mean annual precipitation ranges from 6 to 9 inches, and the frost-free season is 100 to 120 days.

These soils have very slow permeability through the subsoil and substrata. Runoff is very slow. The wind erosion is high. Available water capacity is high, and effective rooting depth is more than 60 inches.

The soils of this unit are suitable for use as irrigated cropland with severe limitations imposed by coarse surface texture and very slow permeability. Sprinklers may be the best method of irrigation on these soils.

Desirable management practices to offset or minimize limitations and maintain production on these soils are: use of plants adapted to the length of growing season; proper irrigation to provide for water control and efficient irrigation; and fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT IVs-53, IRRIGATED

This unit consists of well drained soils on gently to moderately sloping alluvial fans and terraces with slopes of 2 to 4 percent. Surface textures are stony very fine sandy loams, and subsoil textures are very fine sandy loam or silt loam. These soils are underlain at depths of 10 to 20 inches by cemented hardpans. The mean annual precipitation ranges from 8 to 10 inches, and the frost-free season is 100 to 120 days.

These soils have moderate permeability. Runoff is slow to medium depending on slope. The erosion hazard is slight to moderate. Available water capacity is low, and effective rooting depth is 10 to 20 inches.

The soils in this unit are suitable for irrigated cropland with severe limitations imposed by slope and restricted depth. Erosion is a hazard due to slope.

Desirable management practices to offset or minimize limitations and maintain production on these soils are: use of plants adapted to depth of soil; proper irrigation to provide for water control and efficient irrigation; and fertilization and crop residue utilization such as use of green manure crops and other additions of organic matter to maintain fertility, structure, tilth, and infiltration of water.

CAPABILITY UNIT VIw-220, DRYLAND

This unit consists of deep, poorly drained soils on nearly level flood plains with slopes of 0 to 2 percent. Surface textures are silty clay loam and loam which are underlain by somewhat stratified silty clay loam, silt loam, loam, very fine sandy loam and fine sand. The mean annual precipitation ranges from 7 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability is moderately slow to moderate. Runoff is slow or very slow and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management practices should be aimed to improve the productivity of the plants preferred by livestock and wildlife species which use areas of this unit.

CAPABILITY UNIT VIw-221, DRYLAND

This unit consists of deep, moderately well, somewhat poorly and poorly drained, slightly saline-alkali soils on nearly level alluvial fans, terraces and flood plains with slopes of 0 to 2 percent. Surface textures include fine sandy loam, silt loam and silty clay loam. Subsoil and underlying textures include fine sandy loam, very fine sandy loam and some silt loam and silty clay loam. The mean annual precipitation ranges from 7 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability ranges from moderately slow to slow. Runoff is very slow or slow, and the erosion hazard is slight. Available water capacity is moderate to high, and effective rooting depth is more than 60 inches.

The soils in this unit are used principally for grazing and wildlife habitat.

These soils produce salt-tolerant plants which obtain most of their water requirements from ground water. Management practices should be aimed to improve the productivity of plant species preferred by livestock and wildlife which use areas of this unit.

CAPABILITY UNIT VIw-227, DRYLAND

This unit consists of deep, moderately well, somewhat poorly and poorly drained, saline-alkali soils on nearly level terraces, alluvial fans and flood plains with slopes of 0 to 2 percent. Surface textures include fine sandy loam, very fine sandy loam and silt loam. Subsoil and underlying textures include fine sandy loam, silt loam, silty clay loam, and silty clay. The mean annual precipitation is 6 to 10 inches. The frost-free season is 100 to 120 days.

The soils have slow or very slow permeability. Runoff is slow, and the erosion hazard is slight. Available water capacity is moderate to high, and effective rooting depth is more than 60 inches.

The soils in this unit are used principally for grazing and wildlife habitat. They produce salt-tolerant plants which obtain most of their water requirements from ground water.

Management should be aimed to improve the productivity of plant species preferred by livestock and wildlife which use areas of this unit.

CAPABILITY UNIT VIw-228, DRYLAND

This unit consists of deep, poorly drained, fine textured, saline-alkali soils on nearly level flood plains with 0 to 2 percent slopes. Texture of the surface is silty clay and in subsurface horizons it is silty clay, silty clay loam and clay. The mean annual precipitation is 5 to 8 inches, and the frost-free season is 100 to 120 days.

Permeability is slow. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is more than 60 inches.

The soils are used principally for livestock grazing and wildlife habitat. They are not suitable for range seeding. Vegetation is primarily water and salt tolerant plants.

Management should be aimed to improve the productivity of plants preferred by livestock and the wildlife which use the unit for their habitat.

CAPABILITY UNIT VIs-211, DRYLAND

This unit consists of moderately deep, well drained soils on moderately steep mountain hillsides with slopes of 15 to 30 percent. These soils have stony loam surfaces and loam and silt loam subsoils. They are underlain by bedrock at depths of 20 to 40 inches. The mean annual precipitation is 12 to 16 inches, and the frost-free season is 50 to 80 days.

The soils have moderate permeability. Runoff is moderate to rapid and the erosion hazard is moderate to high. Available water capacity is moderately low to moderately high, and effective rooting depth is 20 to 25 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Objectives of management for this unit should provide for adequate vegetative cover to prevent serious erosion, and to improve the productivity of plant species preferred by livestock and wildlife which use the area.

CAPABILITY UNIT VIs-214, DRYLAND

This unit consists of moderately deep, well drained soils on strongly sloping and moderately steep mountain hillsides. Slopes range from 4 to 30 percent. These soils have stony loam surfaces and stony and gravelly clay loam subsoils. They are underlain by bedrock at 20 to 36 inches. The mean annual precipitation is 12 to 15 inches, and the frost-free season is 50 to 70 days.

The soils have slow permeability. Runoff i moderate to rapid, and the erosion hazard is moderate to high. Available water capacity is low to moderately low, and effective rooting depth is 15 to 20 inches.

The soils are used principally for livestock grazing and wildlife habitat.

Management of the soils in this unit should be aimed to maintain an adequate plant cover to prevent erosion, and improve the productivity of plant species preferred by livestock and desirable for wildlife habitat.

CAPABILITY UNIT VIs-221, DRYLAND

This unit consists of moderately well drained soils on nearly level alluvial fans, terraces and flood plains with 0 to 2 percent slopes. Surface textures are silt loam and very fine sandy loam, and the subsurface is silt loam and silty clay loam. The mean annual precipitation is 6 to 9 inches, and the frost-free season is 100 to 120 days.

The soils have moderately slow permeability. Runoff is very slow or slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is 20 to 25 inches.

This unit is presently used primarily for livestock grazing and wildlife habitat.

Management should be aimed to improve the productivity of plants preferred by livestock and those desirable for wildlife habitat.

CAPABILITY UNIT VIs-236, DRYLAND

This unit consists of deep, somewhat excessively drained soils on moderately steep alluvial fans and terraces. Slopes are 15 to 30 percent. These soils have cobbly or stony sandy loam and loam surface textures, and gravelly loam or gravelly sandy loam subsoils. They are underlain at depths of 10 to 20 inches by gravel and gravelly sands. The mean annual precipitation is 7 to 10 inches, and the frost-free season is 100 to 120 days.

The permeability of the soils is moderately rapid through the subsoil, and rapid through the underlying gravel. Available water capacity is moderately low to moderately high, and effective rooting depth is 25 inches. The erosion hazard is moderate.

The unit is used primarily for livestock grazing and wildlife habitat.

Management should be aimed at maintaining a desirable vegetative cover to prevent erosion, and to improve the productivity of plants preferred by livestock and desirable for wildlife habitat.

CAPABILITY UNIT VIc-220, DRYLAND

This unit consists of moderately deep and deep, well and somewhat excessively drained soils on alluvial fans, terraces and flood plains with 0 to 15 percent slopes. Surface textures include loamy fine sand, fine sandy loam, gravelly fine sandy loam, loam and gravelly loam. Subsurface textures are fine sandy loam, very fine sandy loam or loam with or without gravel. Some soils in this unit are underlain by gravelly sand at depths below 10 inches. Other soil have strongly cemented hardpans at depths below 20 inches. The mean annual precipitation is 8 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability of the soils is moderately slow to moderately rapid. Runoff is slow to rapid depending on slope. The erosion hazard is slight to high. Available water capacity is moderately low to high, and effective rooting depth is 20 to 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the unit should be aimed to improve the vegetative cover to prevent erosion and increase the productivity of plants preferred by livestock and those desirable for wildlife habitat.

CAPABILITY UNIT VIIe-220, DRYLAND

This unit consists of deep, well drained soils on steep and very steep mountain hillsides. Slopes are 30 to 70 percent. Surface textures are loam or very fine sandy loam which are underlain by gravelly loam or loam subsoils. The mean annual precipitation is 10 to 12 inches, and the frost-free season is 80 to 100 days.

The soils have moderately permeability. Runoff is rapid, and the erosion hazard is high. Available water capacity is moderately low to high, and effective rooting depth is 20 to 40 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the unit should be aimed to maintain a satisfactory vegetative cover to prevent erosion, and to increase the productivity of plants preferred by livestock and desired for wildlife habitat.

CAPABILITY UNIT VIIe-221, DRYLAND

This unit consists of shallow, well drained soils on moderately steep alluvial fans and terraces with 15 to 30 percent slopes. Surface textures are fine sandy loam which are underlain by very fine sandy loam or silt loam. The soils are underlain at 10 to 21 inches by indurated hardpan. The mean annual precipitation ranges from 8 to 10 inches, and the frost-free season is 100 to 110 days.

The soils have moderate permeability. Runoff is rapid, and the erosion hazard is high. Available water capacity is low, and effective rooting depth is 10 to 20 inches.

The soils in this unit are used primarily for livestock grazing and wildlife habitat.

Management to maintain a vegetative cover adequate to prevent erosion is essential. In addition, the productivity of plants preferred by livestock and desirable for wildlife habitat should be an objective of management.

CAPABILITY UNIT VIIe-224, DRYLAND

This unit consists of deep, well drained soils on moderately steep terrace escarpments with slopes of 15 to 30 percent. Surface textures are silt loam and silty clay loam which are underlain by silty clay loam which grade to lacustrine silty clays. The mean annual precipitation is 6 to 9 inches, and the frost-free season is 100 to 120 days.

The soils have very slow permeability. Runoff is rapid, and the erosion hazard is high. Available water capacity is high, and the effective rooting depth is 20 to 40 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the vegetation cover should be aimed to prevent erosion, and encourage the production of plants preferred by livestock and desirable for wildlife habitat.

CAPABILITY UNIT VIIw-221, DRYLAND

This unit consists of deep, somewhat poorly and poorly drained, saline-alkali soils on nearly level alluvial fans, terraces and flood plains with slopes of 0 to 2 percent. Surface textures range from loamy fine sand to silty clay loam, and are underlain by materials ranging from loamy fine sand to silty clay loam. The mean annual precipitation ranges from 6 to 10 inches, and the frost-free season is 100 to 120 days.

The permeability is moderately slow to rapid. Runoff is very slow to slow, and the erosion hazard is slight. Sagou e soils have a high hazard to wind erosion. Available water capacity is moderately low to high. Effective rooting depth is more than 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should be aimed to improve the productivity of plants preferred by livestock, and those desirable for wildlife habitat. Prevention of soil blowing on Sagouspe soils is essential.

CAPABILITY UNIT VIIw-227, DRYLAND

This unit consists of deep, moderately well to poorly drained, strongly saline-alkali soils on terraces and flood plains with 0 to 2 percent slopes. Surface textures are silt loam and silty clay loam which extends to 60 inches. The mean annual precipitation ranges from 6 to 10 inches, and the frost-free season is 100 to 120 days.

The permeability is slow or very slow. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is moderately high to high, and effective rooting depth is 30 to 60 inches.

The salt tolerant vegetative cover on the soils in this unit is used principally for livestock grazing and some wildlife habitat.

Management should be aimed to maintain and improve plants preferred by livestock and those desirable for wildlife habitat.

CAPABILITY UNIT VIIs-211, DRYLAND

This unit consists of moderately deep to deep, well drained, stony soils on very steep mountain hillsides. Slopes range from 50 to 70 percent. These soils have stony loam or stony silt loam surface textures which are underlain by gravelly sandy loam, gravelly loam or gravelly silt loam. The moderately deep soils are underlain by quartzite bedrock at 20 to 40 inches. The mean annual precipitation is 12 to 15 inches, and the frost-free season is 50 to 80 days.

The soils have moderate permeability. Runoff is rapid, and the erosion hazard is high. Available water capacity is low to moderately high, and effective rooting depth is 20 to 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should be aimed to prevent erosion and improve the productivity of plants preferred by livestock, and those desirable for wildlife habitat.

CAPABILITY UNIT VIIs-214, DRYLAND

This unit consists of moderately deep to deep, well drained, stony soils on moderately sloping to steep mountains. Slopes are 4 to 70 percent. These soils are very stony or extremely stony. They have loam or silt loam surface textures, and gravelly, very gravelly or cobbly clay and silty clay subsoils. They are underlain at depths of 20 to 60 inches by bedrock. The mean annual precipitation is 12 to 15 inches, and the frost-free season is 50 to 70 days.

The soils in this unit have slow or very slow permeability. Runoff is medium to rapid, and the erosion hazard is moderate to high. Available water capacity is low to moderately high, and the effective rooting depth is 20 to 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should be aimed to prevent erosion, and improve the productivity of plants preferred by livestock, and those desirable for wildlife habitat.

CAPABILITY UNIT VIIs-218, DRYLAND DRYLAND

This unit consists of shallow to moderately deep, well drained soils on very steep mountain hillsides. Slopes are 50 to 70 percent. These soils have very stony loam surfaces and gravelly clay loam subsoils. They are underlain by bedrock at 15 to 30 inches. The mean annual precipitation is 12 to 15 inches, and the frost-free season is 50 to 70 days.

Soils in this unit have moderately slow permeability. Runoff is very rapid, and the erosion hazard is high. Available water capacity is low, and effective rooting depth is about 15 to 30 inches.

This unit is used principally for livestock grazing, and wildlife habitat.

Management should be aimed to prevent erosion, and improve the productivity of plants preferred by livestock, and those desirable for wildlife habitat.

CAPABILITY UNIT VIIs-221, DRYLAND

This unit consists of moderately well and well drained, saline-alkali soils on nearly level alluvial fans, terraces and flood plains with 0 to 2 percent slopes. Surface textures are fine sandy loam, very fine sandy loam, loam, and silt loam which are underlain by fine sandy loam, silt loam and silty clay loam. The mean annual precipitation is 6 to 9 inches, and the frost-free season is 100 to 120 days.

Permeability of the soils is moderately rapid to moderately slow. Runoff is slow or very slow, and the erosion hazard is slight. Available water capacity is moderately high to high, and effective rooting depth is 20 to 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the unit should be aimed to increase the production of plants preferred by livestock, and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-224, DRYLAND

This unit consists of deep, somewhat excessively drained sandy soils which formed in wind-deposited dunes or lake-shore terraces. Slopes are 0 to 15 percent. Surface textures are fine sands and loamy fine sands which are underlain by fine sands and loamy fine sands which may be stratified with fine sandy loam and very fine sandy loams. The mean annual precipitation is 6 to 10 inches, and the frost-free season is 100 to 120 days.

Permeability of the soils is moderately rapid. Runoff is very slow. Water from precipitation normally infiltrates the soil as rapidly as it falls. The wind erosion hazard is high. Available water capacity is low to moderately low, and effective rooting depth is 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management should assure the maintenance of a good vegetative cover because the soils are subject to blowing and the reestablishment of vegetation is extremely difficult. In addition to maintaining a good vegetative cover, management should be aimed to encourage growth of plants preferred by livestock, and those desirable for erosion control and wildlife habitat.

CAPABILITY UNIT VIIs-226, DRYLAND

This unit consists of deep, well drained soils on nearly level terraces with slopes of 0 to 2 percent. Surface textures are silt loam. They have silty clay loam subsoils which grade to lacustrine clay at shallow depths. The mean annual precipitation is 6 to 9 inches, and the frost-free season is 100 to 120 days.

The soils have very slow permeability. Runoff is very slow, and the erosion hazard is slight. Available water capacity is high, and effective rooting depth is 20 to 30 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should be aimed to improve the production of plants preferred by livestock and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-229, DRYLAND

This unit consists of deep, well drained soils on nearly level terraces with slopes of 0 to 2 percent. They have loamy fine sand surface textures. They are underlain by silt loam and silty clay which grades to lacustrine clays at 12 to 24 inches. The mean annual precipitation is 6 to 9 inches, and the frost-free season is 100 to 120 days.

The soils have very slow permeability through the subsoil and substrata. Runoff is very slow. The haard for wind erosion is high. Available water capacity is high, and the effective rooting depth is 20 to 30 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Maintenance of a good vegetative cover is important because the soils are susceptible to blowing and revegetation is difficult. Management should also be aimed to improve the plants preferred by livestock and those desirable for wildlife habitat.

CAPABILITY UNIT VIIs-231, DRYLAND

This unit consists of shallow, well drained soils on gently to moderately sloping alluvial fans and terraces with slopes of 0 to 15 percent. Surface textures are silt loam, very fine sandy loam, loam, and fine sandy loam which extends to strongly cemented hardpan at 10 to 20 inches. The mean annual precipitation is 6 to 10 inches, and the frost-free season is 100 to 130 days.

Permeability of the soils is moderate above the hardpan. Run-off is slow to rapid depending on steepness of slope, and the erosion hazard is slight to high. Available water capacity is low to moderately low, and effective rooting depth is 10 to 20 inches.

The soils in this unit are used principally for livestock grazing and some wildlife habitat.

Management should be aimed to improve the production of plants preferred by livestock and those desired for wildlife habitat. Maintenance of a good vegetative cover is necessary for erosion control.

CAPABILITY UNIT VIIs-236, DRYLAND

This unit consists of moderately deep, well drained, stony soils on very steep mountain hillsides. Slopes are 50 to 70 percent. The soils have stony to extremely stony loam or silt loam surface layers, and gravelly clay loam or clay loam subsoils. They are underlain by bedrock at 20 to 40 inches. The mean annual precipitation is 10 to 12 inches, and the frost-free season is 80 to 100 days.

The soils in this unit have moderate permeability. Runoff is rapid or very rapid, and the erosion hazard is high. Available water capacity is low to moderately low, and effective rooting depth is 20 to 40 inches.

The soils are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should be aimed to control erosion, and improve the production of plants preferred by livestock and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-237, DRYLAND

This unit consists of shallow, well drained, stony soils on nearly level to very steep alluvial fans, terraces and mountain hillsides. Slopes are 0 to 70 percent. The textures of the surface horizons include stony and very stony sandy loams to silt loams. Subsoils are silt loam, very fine sandy loam and clay loams. The soils are underlain by strongly cemented hardpan or bedrock at 10 to 20 inches. The mean annual precipitation is 7 to 10 inches, and the frost-free season is 80 to 120 days.

The soils in this unit have slow or very slow permeability. The runoff is slow to very rapid, and the erosion hazard is slight to high. Available water capacity is low, and effective rooting depth is 10 to 20 inches.

The unit is used principally for livestock grazing and wildlife habitat.

Management of the vegetation should provide for erosion control, and be aimed to improve the production of plants preferred by livestocky and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-238, DRYLAND

This unit consists of very shallow, well drained soils on steep mountain hillsides with 30 to 50 percent slopes. The surface layers and subsoil are cobbly coarse sandy loams which are underlain at 5 to 10 inches by weathered granitic bedrock. They are underlain by hard bedrock at 20 to 40 inches. The mean annual precipitation is 10 to 12 inches, and the frost-free season is 100 to 110 days.

The soils in this unit have rapid permeability. Runoff is rapid, and the erosion hazard is high. Available water capacity is low, and effective rooting depth is 5 to 10 inches.

The unit is used principally for livestock grazing and wildlife habitat.

Maintenance of a good vegetative cover to control erosion is essential. Management of the vegetative cover should provide to improve the production of plants preferred by livestock and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-239, DRYLAND

This unit consists of moderately deep to deep, well drained, stony soils on steep and very steep mountain hillsides with slopes of 30 to 70 percent. Surface textures are stony or very stony silt loam, loam or sandy loam which are underlain by gravelly clay loam or gravelly clay. Bedrock is at 20 to 60 inches. The mean annual precipitation is 8 to 12 inches, and the frost-free season is 80 to 120 days.

The soils in this unit have slow or very slow permeability. Runoff is rapid or very rapid, and the erosion hazard is high. Available water capacity is low to moderately high, and effective rooting depth is 20 to 60 inches.

The unit is used principally for livestock grazing, and wildlife habitat.

Management of the vegetative cover should provide for erosion control and improving the production of plants preferred by livestock, and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-243, DRYLAND

This unit consists of moderately deep to deep, well drained, stony soils on steep mountain hillsides. Slopes are 30 to 50 percent. The surface textures are stony or extremely stony sandy loam which are underlain by gravelly sandy loam. They are underlain at 20 to 40 inches by weathered granite bedrock. The mean annual precipitation is 10 to 12 inches, and the frost-free season is 80 to 100 days.

The soils in this unit have rapid or very rapid permeability. The runoff is rapid, and the erosion hazard is high. Available water capacity is low to moderately low, and the effective rooting depth is 20 to 40 inches.

The soils are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should provide for erosion control, and the improved production of plants preferred by livestock and those desired for wildlife habitat.

CAPABILITY UNIT VIIs-265, DRYLAND

This unit consists of deep, well drained, sandy soils on moderately sloping alluvial fans and terraces with slopes of 4 to 8 percent. The surface layers are loamy sand which are underlain by very fine sandy loams or fine sandy loams. The mean annual precipitation is 6 to 8 inches, and the frost-free season is 100 to 120 days.

The soils in this unit have moderately slow permeability. The runoff is moderately slow, and the susceptibility to wind erosion is high. Available water capacity is moderate, and effective rooting depth is 60 inches.

The unit is used principally for livestock grazing and some wildlife habitat.

Maintenance of the vegetative cover is essential to control soil blowing. In addition to erosion control, the vegetative cover should be managed to improve the productivity of plants preferred by livestock and those desired for wildlife habitat.

CAPABILITY UNIT VIIc-240, DRYLAND

This unit consists of moderately deep to deep, well drained soils on nearly level to moderately sloping alluvial fans, terraces and low foothills. Slopes are 0 to 15 percent. They have loam, silt loam and very fine sandy loam surface layers and fine sandy loam, very fine sandy loam, loam, gravelly loam, and gravelly clay subsurface layers. Some of these soils are underlain by strongly cemented hardpans at 20 to 30 inches. The mean annual precipitation is 6 to 8 inches, and the frost-free season is 100 to 120 days.

Permeability is moderate to slow. Runoff is slow to rapid, and the erosion hazard is slight to high. Available water capacity is moderately low to high. Effective rooting depth is 20 to 60 inches.

The soils in this unit are used principally for livestock grazing and wildlife habitat.

Management of the vegetative cover should be aimed at erosion control, and to improve the production of plants preferred by livestock and those desired for wildlife habitat.

CAPABILITY UNIT VIIIs

This unit consists of exposures or outcrops of bare bedrock on mountain hillsides. Slopes are very steep to nearly cliff-like. Surface runoff is very rapid. Soil material is very scarce, accumulating in slight amounts in depressions or crevices in the rocks. There is little or no vegetation because of lack of soil material.

These areas have no value for agricultural use, either as cropland or grazing land for livestock. They are suitable only for some wildlife, watershed, and recreational uses.

Use of Soils for Range[4/]

A major part of the Sonoma Planning Unit is rangeland that completely surrounds the irrigated part of the Area. Where the native vegetation is dependent upon precipitation for its moisture, vegetation is sparse and forage production is low, especially at the lower altitudes. In the flood plains the natural precipitation is supplemented by flooding from runoff water and by ground water. Forage production in these areas is higher. It can be increased on some of the soils in the Area by brush removal and seeding of adapted species of grass.

Most of the land used for range is public land administered by the Bureau of Land Management. Use of the public range along with privately owned range is a significant part of livestock growers' economic base.

4/ J. David Swanson, Range Conservationist, Soil Conservation Service assisted in preparing this section.

Range sites and condition classes

Range sites are distinctive kinds of rangeland that have a different potential for producing plants. Range sites are the products of all the environmental factors, including soil, temperature, precipitation, and elevation.

Range condition of a particular range site is the present state of vegetation of that site in relation to the climax or potential plant community.

A range operator who knows the important range sites on his land and the condition of each can determine if his range is producing the best possible usable forage plants. He can determine if the range condition is improving or deteriorating. He can then decide upon the best management plan to suit his needs.

Descriptions of the range sites

The soils of the Sonoma Planning Unit have been grouped into 18 range sites according to the kinds and amounts of vegetation they have the potential to produce. Excluded from the range site groupings is Rock outcrop which is a miscellaneous land type, but not soil.

The names of the soil series represented in the survey area are mentioned in the description of each range site. This does not mean, however, that all the soils in a series are included in any one range site. Some soil series have two or more phases which may be in two or more range sites. Detailed information for each of the soils mentioned can be found in the section entitled, "Descriptions of the Soils."

RANGE SITE NV-24-1 (SAND HILLS)

This range site consists of the soils of the Goldrun series. They are in wind-deposited, partly stabilized sand dunes and lake-shore terraces which are superimposed over valley flats, alluvial fans, and terraces. Elevation ranges from 3,500 to 5,000 feet. Average annual precipitation is 6 to 10 inches. Nearly all the precipitation infiltrates the soil immediately and is available for plant use. Precipitation wets the soil to a depth of 24 to 36 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is about 2 to 2.5 inches.

Typically, the soils are somewhat excessively drained and have slopes ranging from 0 to 16 percent with some micro slopes approaching 60 percent. They consist of deep and very deep fine sands which are without horizon development.

The approximate composition by weight of the potential plant community is: 10 to 20 percent big sagebrush, 5 to 10 percent spiny hopsage, 5 to 8 percent hairy horsebrush, 2 to 10 percent fourwing saltbush, 4 to 16 percent other shrubs, 20 to 40 percent Indian ricegrass, 5 to 15 percent needleandthread, 2 to 10 percent thickspike wheatgrass, 6 to 19 percent other grasses, and 8 to 15 percent forbs. Big sagebrush, spiny hopsage and hairy horsebrush are not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential, Indian ricegrass, needleandthread, and fourwing saltbush decrease, and black greasewood and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 700 pounds per acre in favorable years and about 450 pounds per acre in unfavorable years.

RANGE SITE NV-24-2 (DESERT LOAMY)

This range site consists of soils of the Adelaide, Benin, Blackhawk, Dun Glen, Golcondoa, Pumper, Raglan, and Weso series. These soils are on alluvial fans, terraces and low foothills. Elevation ranges from 4,000 to 5,800 feet. The average annual precipitation is 5 to 8 inches. Most of the precipitation infiltrates the soils and is available for plant use. The precipitation wets the soil to a depth of 10 to 25 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth ranges from about 2 to 4.5 inches.

The soils in this site typically are well drained and have slopes of 0 to 30 percent. They have surface layers of silt loam, loam or very fine sandy loam. The Adelaide and Blackhawk soils have silica-cemented hardpans at 10 to 20 inches. The Benin soils are underlain at about 10 inches by lacustrine clay. The Golconda soils have clay subsoil underlain by silica-cemented hardpans. Pumper soils are underlain by gravel at 10 to 20 inches. Raglan soils have heavy loam or light clay loam subsoils and weakly cemented substrata. Dun Glen and Weso soils have silt loam to sandy loam subsoils and substrata. Weso soils have weakly cemented horizons.

The approximate composition by weight of the potential plant community is: 40 to 60 percent shadscale, 20 to 40 percent bud sagebrush, 2 to 5 percent spiny hopsage, 2 to 10 percent other shrubs, 2 to 10 percent squirreltail, 5 to 10 percent Indian ricegrass, 2 to 5 percent Sandberg bluegrass, 1 to 3 percent other grasses, and 1 to 5 percent various forbs and annuals.

When range condition deteriorates from the potential Indian ricegrass and bud sagebrush decrease, and shadscale and annuals increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 600 pounds in favorable years and about 300 pounds per acre in unfavorable years.

RANGE SITE NV-24-3 (DESERT SODIC TERRACE)

This range site consists of the soils of Benin, Prida, and Raglan series. The soils are on alluvial fans and terraces. Elevation is 4,000 to 5,000 feet. The average annual precipitation is 6 to 10 inches. Roots of black greasewood, rubber rabbitbrush, big saltbush, and seepweed penetrate deeply enough to obtain moisture from the ground water capillary zone. Shadscale, bud sagebrush and other shallow rooted plants obtain their moisture from the scanty precipitation. The root zone depth for these plants is 20 to 25 inches. The available water capacity for this depth is about 2.5 to 4 inches.

The soils in this range site are moderately well and somewhat poorly drained and have slopes of 0 to 2 percent. They have surface layers of saline-alkali silt loams, very fine sandy loams and loams, silt loams, very fine sandy loams and loams, silt loam subsoils, and substrata of silty clay loam or silty clay.

The approximate composition by weight of the potential plant community is: 15 to 40 percent black greasewood, 30 to 60 percent shadscale, 2 to 5 percent seepweed, 10 to 25 percent other shrubs, 2 to 5 percent each squirreltail and basin wildrye, 1 to 3 percent other grasses, and 2 to 8 percent forbs including various annuals. Black greasewood is not generally used by cattle. Many of the forbs and annuals have limited use.

When range condition deteriorates from the potential perennial grasses descrease, and black greasewood, seepweed, and low quality annuals increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 650 pounds in favorable years, and about 325 pounds per acre in unfavorable years.

RANGE SITE NV-24-5 (LOAMY, 8 to 10 INCH PRECIPITATION ZONE)

This range site consists of soils of the Chiara, Pocan, Shabliss, Shoken, and Trunk series. These soils are on alluvial fans, terraces foothills, and mountain slopes. Elevation is 4,400 to 5,500 feet. The average annual precipitation is 8 to 10 inches. Rooting depth for major plant species ranges from about 5 to 25 inches. Available water capacity for this rooting depth is about 1 to 4 inches.

The soils of this range site typically are well drained and have slopes ranging from 0 to 50 percent. They have surface layers of silt loam or loam. Chiara and Shabliss soils have silt loam subsoils underlain by hardpans. Pocan soils have clay loam subsoils underlain by bedrock. Shoken soils have sandy loam subsoils underlain by granitic bedrock. Trunk soils have clay subsoils underlain by bedrock.

The approximate composition of weight of the potential plant community is: 10 to 20 percent big sagebrush, 13 to 35 percent various other shrubs including spiny hopsage, rabbitbrush, broom snakeweed, and others. Also included is 5 to 20 percent Thurbers needlegrass, 5 to 10 percent each, squirreltail and Sandberg bluegrass, 5 to 20 percent bluebunch wheatgrass, 8 to 20 percent other grasses, and 8 to 15 percent forbs. Big sagebrush is not generally used by cattle. Many of the forbs and other species of brush have limited use.

When range condition deteriorates from the potential most of the perennial grasses will decrease and big sagebrush, broom snakeweed, annual grasses and low quality forbs will increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 800 pounds per acre in favorable years and about 400 pounds per acre in unfavorable years.

RANGE SITE NV-24-6 (DRY FLOOD PLAIN)

This range site consists of soils of the Needle Peak series. They are on the fringes of flood plains, dissected alluvial fans and along intermittent drainageways. Elevation ranges from 4,000 to 5,000 feet. Average annual precipitation is 6 to 10 inches. Due to the flood plain or semiflood-plain position these soils normally receive supplemental moisture during the spring months in the form of runoff from adjacent areas. Rooting depth of major plant species is 20 to 25 inches. Available water capacity for this rooting depth is 3.5 to 4.5 inches.

Typically, the soils are moderately well drained and have slopes of 0 to 2 percent. They have surface layers and subsoils of silt loam and silty clay loam. The substrata is silty clay loam. These soils are normally slightly to strongly saline.

The approximate composition by weight of the potential plant community is: 50 to 65 percent basin wildrye, 15 to 20 percent big sagebrush, 5 to 10 percent other shrubs including black greasewood, rubber rabbitbrush and littleleaf horsebrush, 2 to 10 percent streambank wheatgrass, 2 to 5 percent squirreltail, 1 to 5 percent inland saltgrass, and 2 to 5 percent forbs. The shrubs in this site are not generally used by cattle. Many of the forbs have limited use.

When range condition deteriortates from the potential basin wildrye and other grasses decrease, and big sagebrush, black greasewood, rabbitbrush, and low quality annuals and forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 1,500 pounds per acre in favorable years and about 600 pounds per acre in unfavorable years. Annuals and forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-7 (SALINE BOTTOM)

This range site consists of soils of the Needle Peak, Humboldt, and Sonoma series. These soils are on flood plains. Elevation ranges from 4,000 to 5,000 feet. The average annual precipitation is 5 to 10 inches which is supplemented by a seasonal water table and spring runoff from adjacent areas. Many of the native plant species, such as greasewood, rabbitbrush, saltgrass and seepweed obtain much of their moisture from the ground water capillary zone. The root zone depth for native plant species in these soils ranges from 30 to 60 inches. The total available water capacity for this root zone depth of about 5 to 10 inches.

These soils are somewhat poorly and poorly drained and have slopes of 0 to 2 percent. They have surface layers of saline-alkali silt loams and silty clay loams and subsoils and substrata of stratified silty clay loam, silty clay, and silt loam. The subsoil and substrata are usually less saline than the surface layers.

The approximate composition by weight of the potential plant community is: 30 to 50 percent basin wildrye, 8 to 20 percent inland saltgrass, 15 to 30 percent alkali sacaton, 2 to 5 percent other grasses and grass-like plants, 5 to 15 percent black greasewood, 2 to 5 percent rubber rabbitbrush, 1 to 5 percent other shrubs and 3 to 10 percent forbs. Black greasewood and rubber rabbitbrush and not generally used by cattle.

When range condition deteriorates from the potential basin wildrye and alkali sacaton decrease, and black greasewood and rabbitbrush increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 1,700 pounds per acre in favorable years and about 600 pounds in unfavorable years.

RANGE SITE NV-24-8 (MOIST FLOOD PLAIN)

This range site consists of the soils of the Humboldt, Rose Creek and Sonoma series. These soils are on flood plains. Elevations range from 4,000 to 5,000 feet. The average annual precipitation is 6 to 10 inches. The effect of flooding during spring runoff in high run-off years and seasonal ground water tables offset the low amount of precipitation. The root zone depth of many of the plant species in these soils is 30 to 60 inches or more. The total available water capacity for this root zone is about 6 to 12 inches.

The soils in this site are somewhat poorly and poorly drained and have slopes of 0 to 2 percent. A seasonal high water table fluctuates between depths of 1 to 10 feet. They have surface layers that range in

texture from loam to silty clay, including silt loam and silty clay loam. Subsoils also have about the same range in textures. Substrata are often stratified and include silty clay loam, silt loam, loam, very fine sandy loam, fine sandy loam, loamy sand, sand, and gravel.

The approximate composition by weight of the potential plant community is: 40 to 60 percent basin wildrye, 5 to 20 percent creeping wildrye, 3 to 13 percent sedges and rushes, 3 to 13 percent other grasses, 7 to 25 percent shrubs which include willows, buffaloberry and wildrose, and 3 to 8 percent forbs.

When range condition deteriorates from the potential basin wildrye decreases, and rushes, sedges, willows, wildrose, buffaloberry, and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 5,500 pound per acre in favorable years and 2,500 pounds per acre in unfavorable years.

RANGE SITE NV-24-9 (SALINE MEADOW)

This range site consists of soils of the Duffer and Sonoma series. These soils are on flood plains, terraces, and lake plains. Elevation ranges from 4,000 to 5,000 feet. The average annual precipitation is 6 to 10 inches. The native vegetation obtains much of its moisture from ground water. The total available water capacity for this soil is 6 to 8 inches.

Typically, the soils are poorly drained and sline-alkali affected. Slopes are 0 to 2 percent. A seasonal high water table fluctuates within a depth of 1 to 5 feet. The surface layer ranges from silty clay loam to silt loam, the subsurface soil is silty clay loam, and the substrata consists of white, marly, iron mottled silty clay loam.

The approximate composition by weight of the potential plant community is: 30 to 50 percent basin wildrye, 10 to 20 percent alkali sacaton, 5 to 10 percent inland saltgrass, 8 to 25 percent other grasses, 7 to 15 percent shrubs, and 3 to 8 percent forbs. Black greasewood and rubber rabbitbrush are not generally utilized by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential basin wildrye and alkali sacaton decrease, and black greasewood, rubber rabbitbrush, and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 3,200 pounds per acre in favorable years and about 1,700 pounds per acre in unfavorable years.

RANGE SITE NV-24-10 (SODIC FLOOD PLAIN)

This range site consists of the soils of the Duffer and Prida series. The soils are on flood plains, lake plains, terraces and lower slopes of alluvial fans. Elevation is 4,000 to 5,000 feet. The average annual precipitation is 7 to 10 inches. Roots of the black greasewood, iodinebush, seepweed, inland saltgrass, alkali sacaton and other deep-rooted plants penetrate deeply enough to

obtain moisture from the ground water capillary zone. Other plants obtain their moisture from the scanty precipitation. The root zone for these plants is 20 to 25 inches. The available water capacity for this root zone is 3 to 4.5 inches.

The soils in this site range from moderately well to poorly drained and have slopes of 0 to 2 percent. They have surface layers of saline-alkali silt loam and silty clay loam and subsoils of silt loam and silty clay loam. The Duffer soils have marly silty clay loam substrata. The Prida soils have silty clay loam lake-bed substrata.

The approximate composition by weight of the potential plant community is: 25 to 50 percent alkali sacaton, 10 to 20 percent inland saltgrass, 3 to 10 percent basin wildrye, 25 to 60 percent shrubs which include iodinebush, black greasewood, seepweed and others, and 2 to 8 percent forbs. Black greasewood is not generally used by cattle. Many of the other brush species and forbs have limited use.

When range condition deteriorates from the potential alkali sacaton and basin wildrye decrease, and black greasewood and other shrubs of lower palatability increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 350 pounds per acre in favorable years and about 150 pounds in unfavorable years.

RANGE SITE NV-24-11 (SODIC FLAT)

This range site consists of the soils of the Pocker, Preble, and Sagouspe series. These soils are on low stream terraces and flood plains. Elevations range from 3,800 to 5,000 feet. The average annual precipitation is 4 to 9 inches. Nearly all the precipitation infiltrates the soil and is available for plant use. The native vegetation also obtains much of its moisture from ground water. Total available water capacity is 4 to 8 inches.

These soils are typically somewhat poorly drained, saline-alkali soils. A seasonal high water table fluctuates about 1.5 to 10 feet. Slopes range from 0 to 4 percent. The surface layers of Preble and Sagouspe range from loamy sands to silt loam, the subsurface layers are loamy sands to very fine sandy loam and the substrata is loamy sand to gravelly sand with an occasional layer of sandy loam or silt loam. The Pocker soils are deep, silty clay loam and silty clay.

The approximate composition by weight of the potential plant community is: 40 to 60 percent black greasewood, 7 to 20 percent other shrubs, 10 to 20 percent basin wildrye, 2 to 10 percent inland saltgrass, 4 to 10 percent other grasses, and 2 to 5 percent forbs.

When range condition deteriorates from the potential basin wildrye and other grasses decrease, and black greasewood, other shrubs and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 800 pounds per acre in favorable years and 300 pounds per acre in unfavorable years.

RANGE SITE NV-24-13 (LOAMY, 10 to 12 INCH PRECIPITATION ZONE)

This range site consists of the soils of the Golsum, Graley, Granyon, Pernty and Sonocan series. These soils are on mountain slopes. Elevations range from 5,000 to 7,000 feet. The average annual precipitation is 10 to 12 inches. Precipitation normally wets the soil to a depth of 10 to 25 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is 2 to 4 inches.

Typically, these soils are well drained and have slopes from 30 to 70 percent. All except the Granyon soils have loam or silt loam surface horizons and clay or clay loam subsoils underlain by bedrock. The Granyon soils have sandy loam surface and subsurface soils underlain by granitic bedrock. Depths of these soils range from 10 to 20 inches.

The approximate composition by weight of the potential plant community is: 10 to 20 percent big sagebrush, 2 to 5 percent each, serviceberry and common snowberry, 7 to 20 percent of other shrubs, 20 to 30 percent bluebunch wheatgrass, 10 to 20 percent Thurbers needlegrass, 10 to 25 percent other grasses and 10 to 15 percent forbs. Big sagebrush is not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential bluebunch wheatgrass, Thruber needlegrass and other palatable grasses decrease, and big sagebrush, Douglas rabbitbrush, gray horsebrush, and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 1,000 pounds per acre in favorable years and about 600 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-16 (UPLAND RIDGES)

This range site consists of the soils of the Spinlin and Winada series. These soils are on rocky mountain ridges, mountain slopes and plateaus. Elevations are 6,500 to 9,500 feet. The average annual precipitation is 12 to 16 inches. Precipitation normally wets the soil to a depth of 14 to 21 inches which corresponds approximately to the rooting depth of the major plant species. Total available water capacity for this rooting depth is 2 to 3.5 inches.

Typically, these soils are well drained and have slopes ranging from 4 to 70 percent. The Spinlin soils have surface horizons of loam and subsurface horizons of clay. Winada soils have gravelly loam surface layers and gravelly clay loam subsurface layers. These soils are underlain by bedrock and have stones on the soil surface.

The approximate composition by weight of the potential plant community is: 15 to 30 percent low sagebrush, 4 to 10 percent other shrubs, 25 to 45 percent Idaho fescue, 2 to 10 percent Sandberg bluegrass, 3 to 10 percent other grasses and 7 to 18 percent forbs. Approximate vegetation density is 9 to 13 percent.

When range condition deteriorates from the potential Idaho fescue and other palatable grasses decrease, and low sagebrush, low Douglas rabbitbrush and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 600 pounds per acre in favorable years and about 300 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-17 (SEMIDESERT SANDY)

This range site consists of the soils of the Ninch, Preble and Rad series. These soils are on alluvial fans and terraces. Elevation is 4,000 to 5,000 feet. The average annual precipitation is 8 to 10 inches. Nearly all the precipitation infiltrates the soil immediately and is available for plant use. Precipitation wets the soil to a depth of 20 to 36 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is about 2.5 to 5 inches.

Typically, the soils are moderately well to somewhat excessively drained and have slopes of 0 to 16 percent. They have surface layers of fine sand and fine sandy loam, and silt loam. Subsoils and substrata are fine sandy loam, very fine sandy loam and silt loam, and horizons weakly cemented with silica.

The approximate composition by weight of the potential plant community is: 10 to 20 percent big sagebrush, 2 to 5 percent spiny hopsage, 2 to 5 percent other shrubs, 15 to 30 percent needleandthread, 10 to 20 percent Indian ricegrass, 2 to 5 percent squirreltail, 2 to 10 percent other grasses and 7 to 16 percent forbs. Big sagebrush and black greasewood are not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential needleandthread and Indian ricegrass decrease, and big sagebrush, spiny hopsage, black greasewood and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 1,000 pounds per acre in favorable years and about 500 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-18 (SEMIDESERT CLAYPAN)

This range site consists of the soils of Gosumi series. These soils are on mountain slopes. Elevations are 5,500 to 7,000 feet. The average annual precipitation is 10 to 12 inches. The precipitation wets the soil to a depth of 20 to 25 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is 3 to 5 inches.

The soils typically are well drained and have slopes of 30 to 50 percent. They have surface layers of gravelly and stony loam, subsoils of gravelly clay loam, and substrata of gravelly sandy loam. They are underlain by bedrock at depths of 40 to 60 inches.

The approximate composition by weight of the potential plant community is: 20 to 30 percent low sagebrush, 10 to 15 percent other shrubs, 20 to 30 percent Cusick bluegrass, 10 to 20 percent Sandberg bluegrass, 4 to 10 percent other grasses and 10 to 15 percent forbs.

When range condition deteriorates from the potential Cusick bluegrass and other palatable grasses decrease, and low sagebrush, broom snakeweed and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 500 pounds per acre in favorable years and about 300 pounds per acre in unfavorable years.

RANGE SITE NV-24-19 (SEMIDESERT JUNIPER SAVANNAH)

This range site consists of the soils of the Mullyon, Pernty, and Sumine series. These soils are on mountain slopes with elevations of 5,400 to 7,000 feet. The average annual precipitation is 10 to 12 inches. The precipitation wets the soil to a depth of 10 to 20 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is about 2 to 4 inches.

Typically, these soils are well drained and have slopes of 50 to 70 percent. They have surface layers of gravelly and stony loams and silt loam and subsoils of clay loam and silt loam. They are underlain by bedrock at 10 to 40 inches.

The approximate composition by weight of the potential plant community is: 15 to 30 percent Utah juniper, 10 to 20 percent big sagebrush, 5 to 20 percent low sagebrush, 5 to 15 percent other shrubs, 10 to 20 percent bluebunch wheatgrass, 5 to 10 percent each, Thurber needlegrass and Sandberg bluegrass, 5 to 10 percent other grasses, and 6 to 10 percent forbs. Utah juniper and big sagebrush are not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential bluebunch wheatgrass, Thurber needlegrass, and other palatable grasses decrease, and Utah juniper, big sagebrush, broom snakeweed, and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 1,200 pounds per acre in favorable years and 800 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-20 (DROUGHTY LOAM, 8 to 10 INCH PRECIPITATION ZONE)

This range site consists of soils of the Adelaide, Bliss, McConnel, Orovada, and Rebel series. They are on alluvial fans and terraces. Elevations are 3,700 to 5,000 feet. The average annual precipitation is 8 to 10 inches. The precipitation wets the soil to a depth of 10 to 25 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is 2 to 5 inches.

Typically, these soils are well drained and have slopes of 0 to 30 percent. The surface layers and subsoils vary and range from fine sandy loam to silt loam. The Adelaide and Bliss soils have silica-cemented hardpans. The Adelaide soil has a buried clay loam horizon below the hardpans and then commonly another hardpan below that. The McConnel soil is underlain by gravel at 10 to 20 inches. The Orovada and Rebel soils have deep stratified substrata of loam and sandy loam.

The approximate composition by weight of the potential plant community is: 30 to 40 percent big sagebrush, 5 to 15 percent spiny hopsage, 5 to 10 percent other shrubs, 5 to 10 percent Indian ricegrass, 2 to 8 percent bottlebrush squirreltail, 5 to 10 percent other grasses and 5 to 12 percent forbs. Big sagebrush is not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential Indian ricegrass and other palatable grasses decrease, and big sagebrush and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 750 pounds per acre in favorable years and about 400 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-21 (UPLAND LOAMY, 12 to 16 INCH PRECIPITATION ZONE)

This range site consists of the soils of the Dryn, Harcany, Percoun, and Winevada series. These soils are on mountain slopes. Elevations are 6,000 to 9,000 feet. The average annual precipitation is 12 to 16 inches. The precipitation wets the soil to a depth of 10 to 25 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is 2 to 5 inches.

Typically, the soils are well drained and have slopes of 15 to 70 percent. They have surface layers of gravelly and stony silt loam and subsoils ranging from gravelly and stony loam and silt loam to

silty clay loam and clay. They are underlain by bedrock at depths of 20 to 40 inches.

The approximate composition by weight of the potential plant community is: 15 to 25 percent big sagebrush, 5 to 15 percent snowberry, 9 to 20 percent other shrubs, 5 to 15 percent Idaho fescue, 15 to 25 percent bluebunch wheatgrass, 11 to 25 percent other grasses and 8 to 12 percent forbs. Big sagebrush is not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential Idaho fescue, bluebunch wheatgrass and other palatable grasses decrease, and big sagebrush, snowberry and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 1,600 pounds per acre in favorable years and 800 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-22 (SEMIDESERT BENCHLAND)

This range site consists of the soils of the Valmy series. They are on terraces and alluvial fans. Elevations are 3,500 to 5,000 feet. The average annual precipitation is 8 to 10 inches. The precipitation wets the soil to a depth of about 20 to 25 inches which corresponds approximately to the rooting depth of the major plant species. Total available water capacity for this rooting depth is about 2.5 to 4 inches.

The soils of this site typically are well drained and have slopes ranging from 0 to 8 percent. They have surface layers and subsoils of

fine sandy loam and stratified substrata with layers of sandy loam, gravelly sandy loam and gravelly sand.

The approximate composition by weight of the potential plant community is: 30 to 40 percent black greasewood, 20 to 40 percent big sagebrush, 10 to 30 percent other shrubs, 10 to 20 percent grasses which include basin wildrye, Indian ricegrass, bottlebrush squirreltail and others, and 2 to 6 percent forbs. Big sagebrush and black greasewood are generally used by cattle.

When range condition deteriorates from the potential basin wildrye, Indian ricegrass and Sandberg bluegrass decrease, and big sagebrush, black greasewood, and rabbitbrush increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 750 pounds per acre in favorable years to 350 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

RANGE SITE NV-24-23 (UPLAND NORTH SLOPES)

This range site consists of the soils of the Iver, Nomara, and Shepan series. They are on north and east-facing mountain slopes. Elevations are 5,500 to 9,000 feet. The average annual precipitation is 12 to 16 inches. The precipitation wets the soil to a depth of 15 to 25 inches which corresponds approximately to the rooting depth of major plant species. Total available water capacity for this rooting depth is about 2.5 to 5 inches.

Typically, these soils are well drained and have slopes ranging from 30 to 70 percent. They have surface layers of stony and gravelly sandy loam, very fine sandy loam and silt loams, and subsurface layers ranging from gravelly sandy loam to gravelly clay. The Iver soils are more than 60 inches deep. Nomara and Shepan soils are underlain by bedrock at depths of 25 to 60 inches.

The approximate composition by weight of the potential plant community is: 10 to 20 percent big sagebrush and low sagebrush, 1 to 5 percent snowberry, 1 to 5 percent other shrubs, 30 to 60 percent Idaho fescue, 2 to 5 percent Sandberg bluegrass, 5 to 10 percent other grasses and 7 to 10 percent forbs. Big sagebrush is not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential Idaho fescue and other palatable grasses decrease, and big sagebrush, snowberry, and low choice forbs increase.

RANGE SITE NV-24-27 (HIGH MOUNTAIN LOAM)

This site consists of the soils of the Nevada and Panin series. They are on mountain slopes. Elevations range from 7,000 to 9,000 feet. The average annual precipitation is 12 to 20 inches. Precipitation normally wets the soil to a depth of about 15 to 25 inches which corresponds approximately to the rooting depth of the major plant species. Total available water capacity for this rooting depth is 2.5 to 4.5 inches.

Typically, the soils are well drained and have slopes of 4 to 30 percent. They have silt loam or loam surface horizons and gravelly or stony loam or clay loam subsoils underlain by bedrock at depths of 20 to 40 inches.

The approximate composition by weight of the potential plant community is: 10 to 20 percent big sagebrush, 5 to 10 percent snowberry, 4 to 10 percent other shrubs, 10 to 30 percent mountain brome, 5 to 15 percent slender wheatgrass, 15 to 30 percent other grasses, and 10 to 30 percent forbs. Big sagebrush is not generally used by cattle. Many of the forbs have limited use.

When range condition deteriorates from the potential mountain brome, slender wheatgrass and other palatable grasses decrease, and big sagebrush, rabbitbrush, other shrubs of low palatability, and low choice forbs increase.

This range site in good to excellent condition produces a total annual air-dry yield of about 2,200 pounds per acre in favorable years and about 1,400 pounds per acre in unfavorable years. Forbs contribute significantly to the production in favorable years.

Rangeland Seeding

Successful seedings on depleted rangelands of Nevada will result in decreased runoff and subsequent decrease in soil losses from erosion. The former will result in increased amounts of water available to plants for growth and maintenance of plant vigor, while the latter will result in substantial reductions in sediment ield.

The soil suitability rating is intended to be a relative rating suggestive of the number of successful seeding establishments that might be expected during a given period of years. In addition, the number of plant species adapted to the soil and its properties decrease with decreasing soil suitability. For example, successful seedings can be expected in 7 or more years out of 10 for a soil that is rated "good," and any one of several different plants may be successfully seeded. Successful seedings will result in about 5 years out of 10 for a soil that is rated "poor," and ony the most drought tolerant plants can be seeded. A soil rated "very poor," should be considered for seeding only under emergency circumstances, such as after a fire to keep soil erosion losses to a minimum, because seeding success may only be as high as 3 years out of 10, but normally is even less successful.

Also considered in rating a soil for rangeland seeding are machinery limitations that may result from soil properties, such as the presence of stones, rock outcrops, and excessive slope.

It is not the intent of the suitability rating to be a measure of the total annual yield, though in some instances it may be so.

Productivity is dependent upon the interaction of almost all of the soil properties and qualities that are considered.

Table 3 lists the soils according to their suitability for rangeland seeding. The soil is rated good, fair, poor or very poor by its most limiting property.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
11	Adelaide silt loam, 2 to 8 percent slopes.	Very poor	Depth to hardpan.
12	Adelaide silt loam, low rainfall, 0 to 2 percent slopes.	Very poor	Depth to hardpan; low rainfall.
13	Adelaide silt loam, low rainfall, 2 to 8 percent slopes.	Very poor.	Depth to hardpan; low rainfall.
14	Adelaide silt loam, slightly saline-alkali, 0 to 2 percent slopes.	Very poor	Depth to hardpan.
15	Adelaide stony silt loam, 4 to 15 percent slopes.	Very poor.	Depth to hardpan.
16	Benin loamy fine sand, 0 to 2 percent slopes.	Very poor.	Low rainfall; too sandy.
17	Benin silt loam, 0 to 2 percent slopes.	Very poor.	Low rainfall.
18	Benin silt loam, 15 to 30 percent slopes.	Very poor.	Low rainfall.
19	Benin silt loam, saline-alkali, 0 to 2 percent slopes.	Very poor.	Low rainfall; excess salt; excess alkali.
20	Blackhawk silt loam, 0 to 4 percent slopes.	Very poor.	Low rainfall.
21	Bliss fine sandy loam, 2 to 8 percent slopes.	Poor.	Low rainfall; depth to hardpan.
22	Bliss-Chiara association		
	Bliss fine sandy loam, 8 to 15 percent slopes.	Poor.	Low rainfall; depth to hardpan.
	Chiara fine sandy loam, 15 to 30 percent slopes.	Very poor.	Depth to hardpan.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
23	Chiara stony very fine sandy loam, 2 to 4 percent slopes.	Very poor.	Depth to hardpan.
24	Dryn-Winada association		
	Dryn very stony loam, 30 to 50 percent slopes.	Very poor[1/]	Slope.
	Winada very stony loam, 50 to 70 percent slopes.	Very poor.	Slope.
25	Duffer silty clay loam, slightly saline-alkali	Poor.	Low rainfall.
26	Duffer silty clay loam, strongly saline-alkali.	Very poor.	Excess alkali; excess salt.
27	Dun Glen loam, 0 to 2 percent slopes.	Very poor.	Low rainfall.
28	Dun Glen loam, 2 to 4 percent slopes.	Very poor.	Low rainfall.
29	Dun Glen loam, gravel substratum, 0 to 2 percent slopes.	Very poor.	Low rainfall.
30	Golconda silt loam, 2 to 8 percent slopes.	Very poor.	Low rainfall.
31	Golconda silt loam, 8 to 15 percent slopes.	Very poor.	Low rainfall.
32	Goldrun fine sand, 4 to 15 percent slopes.	Very poor.	Too sandy; soil blowing.
33	Goldrun loamy fine sand, 0 to 2 percent slopes.	Very poor.	Too sandy; soil blowing.
34	Goldrun loamy fine sand, undulating.	Very poor.	Too sandy; soil blowing.
35	Goldrun-Benin complex, undulating		
	Goldrun fine sand, 0 to 4 percent slopes.	Very poor.	Too sandy; soil blowing.
	Benin silt loam, 0 to 2 percent slopes.	Very poor.	Low rainfall.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
36	Goldrun-Benin complex, rolling		
	Goldrun fine sand, 4 to 15 percent slopes	Very poor.	Too sandy.
	Benin silt loam, 0 to 2 percent slopes	Very poor.	Low rainfall.
37	Goldrun-Preble complex		
	Goldrun fine sand, 4 to 14 percent slopes	Very poor.	Soil blowing.
	Preble fine sandy loam	Very poor.	Excess alkali; excess salt.
38	Golsum-Graley association		
	Golsum very stony loam, 30 to 50 percent slopes.	Very poor 1/	Slope.
	Graley very stony loam, 30 to 50 percent slopes.	Very poor.	Slope.
39	Graley-Percoun association		
	Graley very stony loam, 30 to 50 percent slopes.	Very poor.	Depth to bedrock.
	Percoun extremely stony silt loam, 30 to 50 percent slopes	Very poor.	Excess stones.
40	Granyon-Shoken association		
	Granyon extremely stony sandy loam, 30 to 50 percent slopes.	Very poor	Slope; excess stones.
	Shoken cobbly coarse sandy loam, 30 to 50 percent slopes.	Very poor.	Slopes; depth to hardpan.
41	Harcany-Winevada association		
	Harcany stony silt loam, 50 to 70 percent slopes	Very poor.	Slope.
	Winevada stony loam, 50 to 70 percent slopes.	Very poor.	Slope.
42	Humboldt silty clay loam, sand substratum.	Poor 2/	Low rainfall.
43	Humboldt silty clay loam, slightly saline.	Poor. 2/	Low rainfall.
44	Humboldt silty clay loam, strongly saline.	Very poor.	Excess salts.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
45	Humboldt silty clay, slightly saline.	Poor.[2/]	Low rainfall.
46	McConnel fine sandy loam, 0 to 2 percent slopes.	Poor.	Depth to gravel.
47	McConnel cobbly sandy loam, 15 to 30 percent slopes.	Poor.	Depth to gravel.
48	McConnel cobbly sandy loam, 15 to 30 percent slopes.	Poor	Depth to gravel.
49	Mullyon-Rock outcrop complex		
	Mullyon stony silt loam, 50 to 70 percent slopes.	Very poor.	Slope.
	Rock outcrop.	-	-
50	Needle Peak silt loam, slightly saline-alkali.	Poor.[2/]	Low rainfall.
51	Needle Peak silt loam, strongly saline-alkali.	Very poor.	Excess alkali; excess salts.
52	Nevtah stony silt loam, 15 to 30 percent slopes.	Poor.	Slope.
53	Ninch fine sand, 0 to 15 percent slopes.	Very poor.	Too sandy; soil blowing.
54	Nomara-Gosumi association		
	Nomara stony silt loam, 50 to 70 percent slopes	Very poor.	Slope.
	Gosumi stony loam, 30 to 50 percent slopes	Very poor.[1/]	Slope.
56	Orovada loam, 0 to 2 percent slopes.	Poor.	Low rainfall.
58	Orovada gravelly loam, 0 to 2 percent slopes.	Poor.	Low rainfall; excess gravel.
59	Orovada gravelly loam, 2 to 4 percent slopes.	Poor.	Low rainfall; excess gravel.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
60	Percoun-Rock outcrop association		
	Percoun extremely stony silt loam, 50 to 70 percent slopes.	Very poor.	Slope.
	Rock outcrop.	-	-
61	Pernty-Iver association, steep		
	Pernty very stony loam, 30 to 50 percent slopes.	Very poor.1/	Slope.
	Iver stony silt loam, 30 to 50 percent slopes.	Very poor.1/	Slope.
62	Pernty-Iver association, very steep		
	Pernty very stony loam, 50 to 70 percent slopes.	Very poor.	Slope.
	Iver stony silt loam, 50 to 70 percent slopes.	Very poor.	Slope.
63	Pocker silty clay loam.	Very poor.	Excess alkali; excess salt.
64	Preble silt loam, slightly saline-alkali.	Poor.	Low rainfall.
65	Preble silt loam, strongly saline-alkali.	Very poor.	Low rainfall; excess alkali; excess salt.
66	Prida silt loam, slightly saline-alkali.	Poor.	Low rainfall.
67	Prida silt loam, strongly saline-alkali.	Very poor.	Excess salt; excess alkali.
68	Pumper loam.	Very poor.	Low rainfall; depth to gravel.
69	Rad loamy fine sand, 4 to 8 percent slopes.	Poor.	Low rainfall; too sandy.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
70	Rad fine sandy loam, 0 to 2 percent slopes.	Poor.	Low rainfall.
71	Rad fine sandy loam, 2 to 4 percent slopes.	Poor.	Low rainfall.
72	Raglan silt loam, slightly saline-alkali.	Very poor.	Low rainfall.
73	Raglan silt loam, strongly saline-alkali.	Very poor.	Low rainfall; excess alkali; excess salt.
74	Rebel loam, 0 to 2 percent slopes.	Poor.	Low rainfall.
75	Rebel loam, 2 to 4 percent slopes.	Poor.	Low rainfall.
76	Rose Creek loam.	Poor.[2/]	Low rainfall.
77	Sagouspe loamy fine sand.	Very poor.	Too sandy; excess salts.
78	Shabliss very fine sandy loam.	Very poor.	Depth to hardpan.
79	Shabliss very fine sandy loam, 8 to 15 percent slopes.	Very poor.	Depth to hardpan.
80	Sonocan-Shepan association		
	Sonocan very stony silt loam, 30 to 50 percent slopes.	Very poor.[1/]	Slope.
	Shepan stony loam, 30 to 50 percent slopes.	Very poor.[1/]	Slope.
81	Sonoma silt loam, slightly saline-alkali.	Poor.[2/]	Low rainfall.
82	Sonoma silt loam, strongly saline-alkali.	Very poor.	Low rainfall; excess alkali; excess salt.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
83	Spinlin-Panin association, sloping		
	Spinlin very stony silt loam, 4 to 15 percent slopes	Fair.	Excess stones.
	Panin stony loam.	Poor.	Depth to bedrock.
84	Spinlin-Panin association, moderately steep		
	Spinlin very stony silt loam, 15 to 30 percent slopes	Fair.	Slope; excess stones.
	Panin stony loam, 15 to 30 percent slopes.	Poor.	Depth to bedrock; slope.
85	Sumine-Pernty association		
	Sumine extremely stony loam, 50 to 70 percent slopes.	Very poor.	Slope; excess stones.
	Pernty very stony loam, 50 to 70 percent slopes.	Very poor.	Slope; excess stones.
86	Trunk-Pocan association		
	Trunk stony loam, 30 to 50 percent slopes.	Very poor.1/	Slope.
	Pocan stony loam, 30 to 50 percent slopes.	Very poor.1/	Slope.
87	Valmy fine sandy loam.	Poor.	Low rainfall.
88	Valmy fine sandy loam, saline-alkali.	Very poor.	Excess alkali; excess salt.
89	Valmy fine sandy loam.	Poor.	Low rainfall.
90	Weso very fine sandy loam, 4 to 8 percent slopes.	Very poor.	Low rainfall.
91	Weso very fine sandy loam, 0 to 2 percent slopes.	Very poor.	Low rainfall.

Table 3.--Soil Suitability for Rangeland Seeding
Sonoma Planning Unit, Nevada

Map symbol	Map unit name	Suitability rating	Features affecting rating
92	Weso very fine sandy loam, gravel substratum, 2 to 4 percent slopes.	Very poor.	Low rainfall.

FOOTNOTES:

1/ Suitability rating is given for normal conditions. For mechanical seeding under emergency conditions, such as after fire to minimize excessive erosion losses; slopes up to 45 percent may be rated poor.

2/ Where these soils are subject to periodic overflow their suitability ratings may be fair.

Use of Soils for Wildlife

Soil directly influence kinds and amounts of vegetation and amounts of water available, and in this way indirectly influence the species of wildlife that inhabit an area. Proper manipulation of soils, water and plants to produce suitable habitat in the most effective way to maintain and improve wildlife populations. Knowing the properties of named kinds of soils makes it possible to predict how soils will behave under various vegetative and water management activities.

Soil properties that affect the productivity of wildlife habitat are: (1) thickness of soil useful to plants, (2) surface texture), (3) available water capacity, (4) water supplying capacity, (5) wetness, (6) surface stoniness or rockiness, (7) flood hazard, (8) slope, (9) permeability of the soil to air and water, and (10) salinity or alkalinity.

Soils are rated on their suitability for growing plants useful to wildlife or their suitability for ponding water. The ratings are based on soil properties and the potential of these soils to produce wildlife habitat. The ratings do not take into account such factors as present use of the soils or present distribution of wildlife and people. Therefore, selection of a site for the development of wildlife habitat will require inspection at the site.

Eight general plant groups or water development groups, called habitat elements are used in rating the soils. Habitat elements are:

Grain and seed crops.--Annual grain-producing plants such as wheat, barley and oats.

Domestic grasses and legumes.--Perennial domestic grasses and legumes that are planted, and provide wildlife food and cover. Included in this group are alfalfa, clover, brome, intermediate wheatgrass and orchardgrass.

Wild herbaceous plants.--Native or naturally established grasses and forbs that provide food and cover for wildlife. Included are basin wildrye, cheatgrass, Nevada bluegrass, and Indian ricegrass.

Hardwood trees.--Non-coniferous trees and associated woody understory that provide cover and produce wildlife food in the form of fruits, nuts, buds, catkins, twigs, bark and foliage. (This habitat element was not used in rating soils in this survey area since there are no hardwood forests.)

Coniferous plants.--Cone bearing trees, associated non-coniferous trees and associated understory plants that furnish cover or supply food in the form of browse, seeds or fruit-like cones. Examples are pinyon pine and juniper. (This habitat element was not used in rating soils in this survey area since there are no coniferous forests.)

Shrubs.--Shrubby plants that provide cover or produce buds, twigs, or foliage used as food by wildlife. Examples are mountain-mahogany, snowberry, sagebrush, serviceberry, chokecherry, shadscale, bud sagebrush, greasewood and rabbitbrush.

Wetland plants.--Annual and perennial herbaceous plants of moist to wet sites, exclusive of submerged or floating aquatics that provide food or cover for wetland forms of wildlife. Typical plants are rushes, sedges, saltgrass, cattail, pickleweed, and alkali sacaton.

Shallow water areas.--Areas of surface water with an average depth of less than 5 feet. They may be natural wet areas or those created by dams, levees or water-control devices in streams or marshes. Examples are muskrat marshes, waterfowl breeding and resting areas, wildlife watering developments, and beaver ponds.

Habitat elements in turn are used to determine the suitability of a soil for producing various kinds of wildlife habitat. Three kinds of wildlife habitat were considered. The potential for woodland habitat was not developed because of the general inability of the soils to support woodland vegetation. There are scattered pinyon-juniper communities which were included in the rangeland habitat.

Openland habitat.--These areas are mainly croplands, haylands, pastures, meadows, lawns and other areas overgrown with grasses, forbs and shrubs. Examples of birds and animals common to these areas are pheasants, mourning doves, rabbits and squirrels. Habitat elements which are important components of openland habitat are grain and seed crops, domestic grasses and legumes, wild herbaceous plants and shrubs.

Wetland habitat.--These areas are swampy, marshy or open-water areas. Examples of birds and animals common to these areas are ducks, geese, and muskrat. Habitat elements which are important components of wetland habitat are wetland plants, and shallow water areas.

Rangeland habitat.--These areas are natural or improved rangeland. Examples of birds and animals common to these areas are chukar, sage grouse, songbirds, deer, mountain lion, antelope, and eagles. Habitat elements which are important components of rangeland habitat are wild herbaceous plants, and shrubs.

The rating for each type of habitat: openland, wetland, and rangeland is based on the suitability of the soil for producing those habitat elements which are important components of each habitat type. Each soil has been rated for its suitability for maintenance, improvement or creation of each of the habitat elements and each kind of wildlife habitat. Soil suitability is expressed by an adjective rating as follows:

Good.--Few or no limitations. Wildlife habitat easily maintained, improved or created.

Fair.--Moderate soil lmitations. Wildlife habitat maintained, improved or created with some difficulty.

Poor.--Severe soil limitations. Maintenance, improvement, or creation of wildlife habitat may be expensive and require intensive effort.

Very poor.--Very severe soil limitations. Maintenance, improvement, or creation of wildlife habitat is so expensive or requires such intensive effort as to be impractical. Unsatisfactory results are probable.

Wildlife suitability groups

A wildlife suitability group consists of soils that have similar ratings for each of the habitat elements and have the same suitability to produce each of the four wildlife habitat types.

In Nevada, wildlife suitability groups are designated by a symbol representing the rating for each kind of wildlife habitat. The first numeral is for Openland habitat; the second numeral is for Woodland habitat; the third numeral is for Wetland habitat; and the fourth numeral is for Rangeland habitat. Numeral 1 is good; 2 is fair; 3 is poor; and 4 is very poor.

In this Area soils are not rated for their suitability for woodland habitat; therefore, a sash is substituted in the wildlife suitability group symbol in place of the numeral for woodland habitat. Irrigated soils are not rated for their suitability for rangeland habitat and nonirrgated soils are not rated for their suitability for openland habitat. In each of these situations, a dash is substituted for the numeral in the group symbol. Also, each of the wildlife suitability groups for irrigated soils have a letter I separated by a hyphen following the numerical symbol.

An example of a wildlife suitability group symbol is 3-4-I. The first numeral (3) indicates the soil is rated poor for openland habitat. The dash following the 3 (second position in the symbol) indicates the soil was not rated for woodland habitat.

The numeral 4 following the dash (the third position in the symbol) indicates the soil was rated very poor for wetland habitat. The dash following the 4 (the fourth position in the symbol) indicates the soil was not rated for rangeland habitat. The letter I at the end of the symbol indicates the soil is irrigated.

Another example is --23. The dashes in positions 1 and 2 in the symbol indicate the soil was not rated for openland habitat or woodland habitat. The numeral 2 in position 3 in the symbol indicates the soil is rated fair for wetland habitat. The numeral 3 in position 4 indicates a rating of poor for rangeland habitat. The absence of a letter I at the end of the symbol indicates the soil is not irrigated.

Table 3 lists the soils with their ratings for each of the habitat elements for which they are rated, and for each wildlife habitat for which they are rated as well as the symbol for the wildlife suitability groups into which they fall.

Table 4.--Suitability of the soils for wildlife habitat
Sonoma Planning Unit, Nevada

Soil series and map symbols	Elements of wildlife habitat: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Wildlife suitability group ratings: Openland habitat	Wetland habitat	Rangeland habitat	Wildlife suitability groups
Adelaide: 11, 12, 13--------	Poor	Poor	Fair	Fair	Poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
14----------	Poor	Poor	Poor	Poor	Poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
15	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Benin: 16, 17--	Poor	Poor	Good	Good	Poor	Very poor	Fair	Very poor	-	2-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
18	-	-	Very poor	Very poor	Poor	Very poor	-	Very poor	Very poor	--44
19----------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Blackhawk: 20---	Poor	Poor	Very poor	Very poor	Poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Very poor	Very poor	Poor	Very poor	-	Very poor	Very poor	--44
Bliss: 21-------	Fair	Fair	Good	Good	Poor	Very poor	Fair	Very poor	-	2-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
22----------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Chiara part of 22---------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Chiara: 23------	Poor	Poor	Fair	Fair	Poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
Dryn: 24--------	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Winada part of 24----------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Rock outcrop part of 24----	-	-	-	-	-	-	-	-	-	-
Duffer: 25------	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	-	2-2-I
	-	-	Very poor	Very poor	Fair	Fair	-	Fair	Very poor	--24
26----------	-	-	Very poor	Very poor	Poor	Fair	-	Poor	Very poor	--34
Dun Glen: 27, 28, 29--------	Good	Good	Good	Good	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Golconda: 30----	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
31----------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Goldrun: 32, 33, 34, 35, 36, 37----------	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Benin part of 35 and 36-----	Poor	Poor	Good	Good	Poor	Very poor	Fair	Very poor	-	2-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43

Table 4.--Suitability of the soils for wildlife habitat
Sonoma Planning Unit, Nevada

Soil series and map symbols	Elements of wildlife habitat						Wildlife suitability group ratings			Wildlife suitability groups
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland habitat	Wetland habitat	Rangeland habitat	
Goldrun (continued)										
Preble part of 37---------	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Very poor	-	2-4-I
	-	-	Very poor	Very poor	Poor	Poor	-	Poor	Very poor	--34
Golsum: 38-----	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Graley part of 38---------	-	-	Very poor	Very poor	Very poor	Very poor	-	Very poor	Very poor	--44
Graley: 39-----	-	-	Very poor	Very poor	Very poor	Very poor	-	Very poor	Very poor	--44
Percoun part of 39---------	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Granyon: 40----	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Shoken part of 40----------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Harcany: 41----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Winevada part of 41---------	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Humboldt: 42---	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	-	2-2-I
	-	-	Fair	Fair	Fair	Fair	-	Fair	Fair	--22
43----------	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	-	2-2-I
	-	-	Poor	Poor	Good	Fair	-	Fair	Poor	--23
44----------	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	-	2-2-I
	-	-	Poor	Poor	Fair	Fair	-	Fair	Poor	--23
45----------	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	-	2-2-I
	-	-	Poor	Poor	Fair	Good	-	Fair	Poor	--23
McConnel: 46, 47, 48--------	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Very poor	-	2-4-I
	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Mullyon: 49----	-	-	Very poor	Very poor	Very poor	Very poor	-	Very poor	Very poor	--44
Rock outcrop part of 49----	-	-	-	-	-	-	-	-	-	-
Needle Peak: 50-	Good	Good	Good	Good	Poor	Poor	Good	Poor	-	1-3-I
	-	-	Poor	Poor	Poor	Poor	-	Poor	Poor	--33
51----------	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Poor	-	2-3-I
	-	-	Very poor	Very poor	Poor	Very poor	-	Poor	Very poor	--34
Nevtah: 52-----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Ninch: 53------	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42

Table 4.--Suitability of the soils for wildlife habitat
Sonoma Planning Unit, Nevada

Soil series and map symbols	Elements of wildlife habitat						Wildlife suitability group ratings			Wildlife suitability groups
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland habitat	Wetland habitat	Rangeland habitat	
Nomara: 54-----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Good	--41
Gosumi part of 54---------	-	-	Poor	Poor	Very poor	Poor	-	Very poor	Poor	--43
Orovada: 56, 58, 59--------	Good	Good	Good	Good	Poor	Very poor	Good	Poor	-	1-3-I
	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Percoun: 60-----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Rock outcrop part of 60----	-	-	-	-	-	-	-	-	-	-
Pernty: 61, 62--	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Iver part of 61 and 62----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Pocker: 63-----	Poor	Poor	Very poor	Very poor	Poor	Poor	Poor	Poor	-	3-3-I
	-	-	Very poor	Very poor	Poor	Poor	-	Poor	Very poor	--34
Preble: 64------	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Very poor	-	2-4-I
	-	-	Very poor	Very poor	Poor	Poor	-	Poor	Very poor	--34
65----------	-	-	Very poor	Very poor	Poor	Poor	-	Poor	Very poor	--34
Prida: 66-------	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Poor	-	3-3-I
	-	-	Poor	Poor	Poor	Poor	-	Poor	Poor	--33
67----------	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Fair	-	3-2-I
	-	-	Very poor	Very poor	Poor	Fair	-	Poor	Very poor	--34
Pumper: 68------	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Rad: 69----------	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
70, 71---------	Good	Good	Good	Good	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Raglan: 72------	Good	Good	Fair	Fair	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Poor	Poor	Poor	Very poor	Good	Very poor	Poor	--43
73----------	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Poor	-	2-3-I
	-	-	Very poor	Very poor	Poor	Poor	-	Poor	Very poor	--34
Rebel: 74, 75---	Good	Good	Good	Good	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Rose Creek: 76--	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair	-	2-2-I
Sagouspe: 77-----	-	-	Very poor	Very poor	Fair	Very poor	-	Poor	Very poor	--34

Table 4.--Suitability of the soils for wildlife habitat
Sonoma Planning Unit, Nevada

Soil series and map symbols	Elements of wildlife habitat						Wildlife suitability group ratings			Wildlife suitability groups
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Shrubs	Wetland plants	Shallow water areas	Openland habitat	Wetland habitat	Rangeland habitat	
Shabliss: 78, 79----------	Poor	Poor	Fair	Fair	Poor	Very poor	Poor	Very poor	-	3-4-I
	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Sonocan: 80----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--43
Shepan part of 80----------	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Sonoma: 81-----	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	-	1-2-I
	-	-	Fair	Fair	Fair	Fair	-	Fair	Fair	--22
82----------	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	-	2-2-I
	-	-	Very poor	Very poor	Poor	Fair	-	Poor	Very poor	--34
Spinlin: 83, 84-	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Panin part of 83----------	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
Panin part of 84----------	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Sumine: 85-----	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Pernty part of 85----------	-	-	Poor	Poor	Very poor	Very poor	-	Very poor	Poor	--43
Trunk: 86------	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Pocan part of 86----------	-	-	Fair	Fair	Very poor	Very poor	-	Very poor	Fair	--42
Valmy: 87, 89--	Good	Good	Good	Good	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Fair	Fair	Poor	Very poor	-	Very poor	Fair	--42
88----------	Good	Good	Good	Good	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Very poor	Very poor	Poor	Very poor	-	Very poor	Very poor	--44
Weso: 90-------	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43
91, 92--------	Good	Good	Good	Good	Poor	Very poor	Good	Very poor	-	1-4-I
	-	-	Poor	Poor	Poor	Very poor	-	Very poor	Poor	--43

Engineering Uses of the Soils[6/]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipeline, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who--

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.

6/ Joe Petty, Engineer, Soil Conservation Service, assisted in preparing this section.

5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in table 5, and 6 which show, respectively, several estimated soil properties significant to engineering and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6, and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists that is not known to all engineers. The Glossary defines many of these terms used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (8) used by the SCS engineers, Department of Defense, and others, and the AASHO system (1) adopted by the American Association of State Highway Officials.

In the Unified system soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML-CL.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and are the poorest soils for subgrade. The estimated AASHO classification is given in table 5 for all soils mapped in the survey area.

USDA texture is determined by the relative proportions of sand, silt, and clay in soil material that is less than 2.0 millimeters in diameter. "Sand," "silt," "clay," and some of the other terms used in the USDA textural classification are defined in the Glossary.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 5.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 5 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt,"

"clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Liquid limit and plasticity index are estimated in table 5.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soil to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Salinity refers to the amount of soluble salts in the soil. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25° C. Salinity affects the suitability of a soil for crop production, its stability when used as construction material, and its corrosiveness to metals and concrete.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Corrosivity, as used in table 5, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is realted to soil properties such as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of low means that there is a low probability of soil-induced corrosion damage. A rating of high means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Date January 1975

Sonoma Planning Unit Nevada

Table 5 - Estimated engineering properties of soils
(Absence of data indicates that the soil is too variable to be rated or that no estimate was made.
The symbol > means greater than; the symbol < means less than)

Soil series and map symbol (1)	Depth to --- Hardpan or bedrock (Ft.) (2)	Depth to --- Seasonal high water table (Ft.) (3)	Depth from surface (Ins.) (4)	Classification: USDA texture (5)	Classification: UNIFIED (6)	Classification: AASHO (7)	Coarse fraction greater than 3 inches (Pct.) (8)	Pct. less than 3 ins. passing sieve--: No. 4 (4.7 mm.) (9)	No. 10 (2.0 mm.) (10)	No. 40 (0.42 mm.) (11)	No. 200 (0.074 mm.) (12)	Liquid limit (13)	Plasticity index (14)	Permeability (Ins./Hr.) (15)	Available water capacity (Ins./In.) (16)	Reaction (pH) (17)	Salinity (ECx10³ @ 25° C.) (18)	Shrink-swell potential (19)	Frost action potential (20)	Corrosivity (Untreated steel) (21)
Adelaide: 11, 12, 13, 14, 15----------	0.8-1.4 1/	> 5	0-11	Silt loam.	ML	A-4	0-5	95-100	95-100	85-95	70-80	30-40	NP-5	0.2-2.0	0.16-0.17	6.6-7.8	2-8	Low	Moderate	High
			11-14	Cemented pan.	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
			14-23	Clay loam.	CL, CH	A-7	0	95-100	95-100	85-95	75-85	45-55	25-30	.06-0.2	0.15-0.17	7.9-9.0	> 8	Moderate	Moderate	High
			23-40	Cemented pan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			40-53	Very gravelly loamy sand.	GM	A-1	0-5	40-50	35-45	25-35	10-15	-	NP	6.0-20	0.04-0.05	7.9-9.0	> 4	Low	Low	High
Benin: 16, 17, 18, 19--------	> 5	> 5	0-8	Loamy fine sand.	SM	A-2	0	100	100	65-75	15-25	-	NP	2.0-6.0	0.08-0.12	7.9-9.0	2-8	Low	Low	High
			8-70	Silty clay.	MH, CH	A-7	0	100	100	95-100	90-95	55-65	25-35	< .06	0.14-0.16	7.9-9.0	> 4	High	Moderate	High
Blackhawk: 20---	1.0-1.7 1/	> 5	0-14	Silt loam.	ML	A-4	0-3	100	95-100	85-95	75-85	25-35	NP-5	0.6-2.0	0.16-0.17	8.5-9.0	< 2	Low	Moderate	High
			14-30	Cemented pan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			30-60	Stratified coarse sand and gravelly coarse sand.	SP-SM, SW-SM	A-1	0-3	90-100	75-85	40-50	5-10	-	NP	> 20	0.04-0.06	> 8.5	> 16	Low	Low	High
Bliss: 21, 22--- For properties of Chiara part of 22, see Chiara series.	1.7-3.0 1/	> 5	0-4	Fine sandy loam.	SM	A-4	0-3	95-100	95-100	65-75	40-50	-	NP	2.0-6.0	0.13-0.14	6.6-7.8	< 2	Low	Moderate	High
			4-28	Very fine sandy loam.	ML	A-4	0	95-100	95-100	80-90	50-60	-	NP	0.6-2.0	0.14-0.16	7.4-9.0	4-16	Low	Moderate	High
			28-45	Cemented pan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chiara: 23-----	1.0-1.7 2/	> 5	0-17	Stony very fine sandy loam.	ML	A-4	5-10	95-100	95-100	80-90	50-60	25-35	NP-5	0.6-2.0	0.14-0.16	6.6-7.8	< 8	Low	Moderate	High
			17-24	Cemented pan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dryn: 24------- For properties of Winada part of 24, see Winada series.	3.3-5.0 2/	> 5	0-11	Very stony loam.	GM, SM	A-4	15-20	65-75	60-70	50-60	35-45	25-35	NP-5	0.6-2.0	0.07-0.10	6.6-7.3	< 2	Low	Moderate	Moderate
			11-48	Very gravelly clay.	GC	A-2, A-7	20-30	45-55	40-50	35-45	30-40	45-55	20-30	.06-0.2	0.06-0.08	6.6-7.3	< 2	High	Moderate	Moderate
			48	Bedrock.																
Duffer: 25, 26--	> 5	1.0-5.0	0-23	Silty clay loam.	CL	A-7	0	100	100	95-100	85-95	40-50	20-30	0.2-0.6	0.14-0.16	> 8.5	> 8	Moderate	High	High
			23-72	Silty clay loam.	CL	A-7	10-20 3/	75-85	75-85	70-80	65-75	40-50	20-30	0.2-0.6	0.12-0.14	> 8.5	> 8	Moderate	High	High
Dun Glen: 27, 28----------	> 5	> 5	0-15	Loam.	ML	A-4	0	95-100	85-95	70-80	50-60	20-30	NP-5	0.6-2.0	0.15-0.17	7.9-9.0	< 4	Low	Moderate	High
			15-61	Fine sandy loam.	SM	A-4	0	95-100	85-95	60-70	35-45	-	NP	0.6-2.0	0.12-0.15	7.9-9.0	4-16	Low	Moderate	High
29----------	> 5	> 5	0-15	Loam.	ML	A-4	0	95-100	85-95	70-80	50-60	20-30	NP-5	0.6-2.0	0.15-0.17	7.9-9.0	< 4	Low	Moderate	High
			15-40	Fine sandy loam.	SM	A-4	0	95-100	85-95	60-70	35-45	-	NP	0.6-2.0	0.12-0.15	7.9-9.0	4-16	Low	Moderate	High
			40-60	Very gravelly loamy coarse sand.	SM	A-1	0-5	60-70	50-60	25-35	10-20	-	NP	6.0-20	0.05-0.07	7.9-9.0	< 8	Low	Low	Low

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Golconda: 30, 31----------	1.7-2.5 1/	> 5	0-10	Silt loam.	ML	A-4	0-5	85-95	80-90	75-85	60-70	25-35	NP-5	0.6-2.0	0.15-0.17	7.4-8.4	2-4	Low	Moderate	High
			10-25	Gravelly clay loam.	CL	A-6	0-5	75-85	70-80	65-75	50-60	30-40	15-25	0.06-0.2	0.15-0.16	7.9-9.0	4-16	Moderate	Moderate	High
			23-36	Cemented pan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			36-60	Very gravelly coarse sand.	GP-GM	A-1	0-5	40-50	30-40	15-20	5-10	-	NP	6.0-20	-	> 7.9	4-8	Low	Low	High
Goldrun: 32, 33, 34, 35, 36, 37-------- For properties of Benin part of 35 and 36, and Preble part of 37, see Benin and Preble series.	> 5	> 5	0-7	Loamy fine sand.	SM	A-2	0	100	100	60-70	15-25	-	NP	6.0-20	0.07-0.10	7.9-8.4	< 4	Low	Low	Moderate
			7-60	Fine sand.	SM	A-2	0	100	100	65-75	15-25	-	NP	6.0-20	0.06-0.09	7.9-9.0	< 4	Low	Low	Moderate
Golsum: 38----- For properties of Graley part of 38, see Graley series.	1.7-3.3 1/	> 5	0-9	Very stony loam.	SM-SC, SC	A-4	10-15	70-80	65-75	55-65	40-50	20-30	5-10	0.6 2.0	0.12-0.14	6.6-7.8	< 2	Low	Moderate	Moderate
			9-34	Very gravelly clay.	GC	A-7	0-5	50-60	45-55	40-50	35-45	40-50	25-35	.06-0.2	0.12-0.14	6.6-7.8	< 2	High	Moderate	Moderate
			34	Weathered bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gosumi:---------	3.3-5.0 2/	> 5	0-8	Stony loam.	GM, SM, ML	A-4	5-10	70-80	65-75	55-65	40-55	20-30	NP-5	2.0-6.0	0.12-0.14	6.6-7.8	< 2	Low	Moderate	High
			8-32	Gravelly clay.	GC	A-2	0-5	45-55	35-45	30-40	25-35	45-55	25-35	< .06	0.08-0.11	6.6-7.8	< 2	High	Moderate	High
			32-50	Gravelly sandy loam.	SM, SM-SC	A-1	0-5	70-80	60-70	35-45	15-25	15-25	NP-5	2.0-6.0	0.08-0.10	7.9-9.0	2-4	Low	Moderate	High
			50-56	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Graley: 39----- For properties of Percoun part of 39, see Percoun series.	0.8-1.7 2/	> 5	0-3	Very stony loam.	GM	A-1, A-2	10-20	40-50	35-45	30-40	20-30	-	NP	2.0-6.0	0.05-0.09	6.6-7.3	< 2	Low	Moderate	Moderate
			3-18	Very gravelly clay loam.	GC	A-2	0-5	35-45	30-40	25-35	20-30	30-40	15-25	.06-0.2	0.05-0.09	6.6-7.3	< 2	Moderate	Moderate	Moderate
			18	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Granyon: 40----- For properties of Shoken part of 40, see Shoken series.	1.7-2.5 1/	> 5	0-6	Extremely stony sandy loam.	SM, SM-SC	A-1, A-2	15-25	80-90	60-70	35-45	20-30	15-25	0-5	6.0-20	0.06-0.10	6.6-7.8	< 2	Low	Moderate	Moderate
			6-23	Gravelly sandy loam.	SM, SM-SC	A-1, A-2	0-5	80-90	60-70	35-45	20-30	15-25	0-5	6.0-20	0.06-0.10	6.6-7.8	< 2	Low	Moderate	Moderate
			23-42	Weathered granite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			42-45	Hard granite.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harcany: 41----- For properties of Winevada part of 41, see Winevada series.	> 5	> 5	0-18	Stony silt loam.	SM	A-4	10-30	70-80	60-70	55-65	40-50	-	NP	0.6-2.0	0.08-0.12	6.6-7.3	< 2	Low	Moderate	Moderate
			18-72	Very gravelly sandy loam.	GM-GC, GC	A-1, A-2	10-30	35-45	30-40	20-30	10-15	15-20	5-10	0.6-2.0	0.05-0.07	6.6-7.3	< 2	Low	Low	Moderate

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Humboldt: 42----	> 5	2-5 4/	0-22	Silty clay loam.	ML, MH	A-7	0	95-100	95-100	90-95	80-90	45-60	15-25	0.2-0.6	0.15-0.17	7.9-9.0	2-8	Moderate	High	High
			22-40	Stratified silt loam and silty clay loam.	ML, CL	A-6, A-7	0	95-100	95-100	85-95	80-90	35-45	10-20	0.2-0.6	0.15-0.17	7.9-9.0	2-8	Moderate	High	High
			40-60	Stratified fine sand to very fine sandy loam.	SM, SM-SC, ML, ML-CL	A-4	0	95-100	95-100	75-85	45-55	15-25	NP-5	2.0-6.0	0.10-0.12	7.9-9.0	2-4	Low	High	High
43, 44, 45----	> 5	1-5 4/	0-18	Silty clay loam.	ML, MH	A-7	0	95-100	95-100	90-95	80-90	45-60	15-25	0.2-0.6	0.15-0.17	7.9-9.0	> 4	Moderate	High	High
			18-60	Stratified silt loam to silty clay.	ML, MH	A-7	0	95-100	95-100	90-95	80-90	45-60	15-25	0.2-0.6	0.15-0.17	7.9-9.0	> 4	Moderate	High	High
Iver:----------	> 5	> 5	0-22	Stony silt loam.	ML, CL-ML	A-4	5-15	90-100	80-90	75-85	55-65	25-35	5-10	0.6-2.0	0.12-0.15	6.1-7.3	< 2	Low	Moderate	Moderate
			22-60	Gravelly loam.	GC, GC-GM, SC, SC-SM	A-4	10-25	60-70	55-65	50-60	35-45	20-30	5-10	2.0-6.0	0.07-0.10	6.6-7.8	< 2	Low	Moderate	Moderate
McConnel: 46----	> 5	> 5	0-16	Fine sandy loam.	SM	A-4	0-5	90-100	85-95	65-75	40-50	-	NP	2.0-6.0	0.12-0.15	6.6-7.8	< 2	Low	Moderate	High
			16-60	Stratified very gravelly fine sandy loam to very gravelly coarse sand.	GM	A-1	0-5	40-50	35-45	20-30	10-15	-	NP	> 20	0.05-0.07	> 7.9	4-16	Low	Moderate	High
47----------			0-16	Gravelly fine sandy loam.	SM	A-2	0-5	65-75	60-70	45-55	25-35	-	NP	2.0-6.0	0.11-0.13	6.6-7.8	< 2	Low	Moderate	High
			16-60	Stratified very gravelly fine sandy loam to very gravelly coarse sand.	GM	A-1	0-5	40-50	35-45	20-30	10-15	-	NP	> 20	0.05-0.07	> 7.9	4-16	Low	Moderate	High
48----------	> 5	> 5	0-16	Cobbly sandy loam.	SM	A-1, A-2	15-25	80-90	75-85	45-55	20-30	-	NP	2.0-6.0	0.12-0.14	6.6-7.8	< 2	Low	Moderate	High
			16-60	Stratified very gravelly fine sandy loam to very gravelly coarse sand.	GM	A-1	0-5	40-50	35-45	20-30	10-15	-	NP	> 20	0.05-0.07	> 7.9	4-16	Low	Moderate	High
Mullyon: 49----- For properties of Rock outcrop, see Rock outcrop.	1.0-1.7	> 5	0-13	Stony silt loam.	ML	A-4	5-10	70-80	65-75	60-70	50-60	30-40	NP-5	0.6-2.0	0.13-0.15	7.9-9.0	2-8	Low	Moderate	High
			13	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Needle Peak: 50, 51--------	> 5	> 5 5/	0-60	Silt loam	ML	A-4	0	95-100	95-100	85-100	75-90	30-40	5-10	0.6-2.0	0.15-0.17	> 7.9	4-16	Low	Moderate	High
Nevtah: 52------	2.0-3.3 2/	> 5	0-20	Stony silt loam.	ML	A-4	5-10	70-80	65-75	60-70	50-60	30-40	NP	0.6-2.0	0.13-0.15	6.6-7.3	< 2	Low	Moderate	Moderate
			20-36	Gravelly loam.	SM, ML	A-4	0-5	70-80	65-75	55-65	45-55	25-35	NP	0.6-2.0	0.12-0.14	6.6-7.3	< 2	Low	Moderate	Moderate
			36	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Ninch: 53------	> 5	> 5	0-25	Fine sand.	SM	A-2	0	100	100	65-80	20-30	-	NP	6.0-20	0.07-0.10	6.6-7.8	< 2	Low	Low	High
			25-35	Loamy fine sand.	SM	A-2	0	100	100	70-80	25-35	-	NP	2.0-6.0	0.08-0.10	7.9-9.0	2-8	Low	Low	High
			35-70	Stratified fine sandy loam and very fine sandy loam.	SM, ML	A-4	0	100	95-100	75-85	45-55	-	NP	2.0-6.0	0.13-0.15	7.9-9.0	4-8	Low	Low	High
Nomara: 54----- For properties of Gosumi part of 54, see Gosumi series.	1.7-3.3 2/	> 5	0-19	Stony silt loam.	ML	A-4	5-10	85-95	80-90	75-85	60-70	30-40	NP	0.6-2.0	0.12-0.15	6.6-7.8	< 2	Low	Moderate	High
			19-40	Very gravelly clay loam.	GC	A-2	0-5	35-45	30-40	25-35	20-30	25-35	10-20	0.2-0.6	0.06-0.08	7.4-9.0	2-4	Moderate	Moderate	High
			40	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orovada: 56-----	> 5	> 5	0-25	Loam.	ML	A-4	0	95-100	90-100	75-85	55-65	25-35	NP-5	0.6-2.0	0.14-0.17	6.6-7.8	< 2	Low	Moderate	High
			25-60	Stratified silt loam and very fine sandy loam.	ML	A-4	0	90-100	85-95	80-90	50-60	25-35	NP-5	0.6-2.0	0.14-0.17	7.9-9.0	4-8	Low	Moderate	High
58, 59--------			0-11	Gravelly loam.	SM	A-4	0-5	70-80	65-75	55-65	40-50	20-30	NP-5	0.6-2.0	0.12-0.15	6.6-7.8	< 2	Low	Moderate	High
			11-25	Loam.	ML	A-4	0	95-100	90-100	75-85	55-65	25-35	NP-5	0.6-2.0	0.14-0.17	7.9-9.0	4-8	Low	Moderate	High
			25-60	Stratified silt loam and very fine sandy loam.	ML	A-4	0	90-100	85-95	80-90	50-60	25-35	NP-5	0.6-2.0	0.14-0.17	7.9-9.0	4-16	Low	Moderate	High
Panin:----------	1.7-3.3 2/	> 5	0-8	Stony loam.	ML	A-4	5-10	90-100	85-95	75-85	55-65	20-30	NP-5	0.6-2.0	0.14-0.16	6.6-7.3	< 2	Low	Moderate	Moderate
			8-22	Extremely stony gravelly clay loam.	SC, CL	A-6	25-35	70-80	65-75	60-70	45-55	25-35	10-20	.06-0.2	0.10-0.14	6.6-7.3	< 2	Moderate	Moderate	Moderate
			22	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percoun: 60----- For Rock outcrop part of 60, see Rock outcrop.	1.7-3.3 2/	> 5	0-13	Extremely stony silt loam.	ML	A-4	20-30	70-80	65-75	60-70	50-60	25-35	NP-5	0.6-2.0	0.10-0.13	6.6-7.3	< 2	Low	Moderate	Moderate
			13-31	Very gravelly silty clay.	GC	A-2	0-5	35-45	30-45	30-45	25-35	30-40	15-25	< .06	0.05-0.07	6.6-7.3	< 2	High	Moderate	Moderate
			31	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pernty: 61, 62-- For properties of Iver part of 61 and 62, see Iver series.	1.2-1.7 2/	> 5	0-2	Very stony loam.	GM	A-1, A-2	5-10	40-50	35-45	30-40	20-30	20-30	NP-5	0.6-2.0	0.05-0.07	6.6-7.3	< 2	Low	Moderate	Moderate
			2-14	Cobbly and gravelly clay loam.	CL	A-6	40-50	75-85	70-80	65-75	50-60	25-35	10-20	0.2-0.6	0.05-0.07	6.6-7.3	< 2	Moderate	Moderate	Moderate
			14	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pocan:----------	3.3-5 2/	> 5	0-10	Stony loam.	ML	A-4	5-10	90-100	85-90	70-80	55-65	20-30	NP-5	0.6-2.0	0.12-0.15	6.6-7.8	< 2	Low	Moderate	High
			10-48	Gravelly loam.	SM, ML	A-4	0-5	70-80	65-75	55-65	40-55	20-30	NP-5	0.06-0.2	0.12-0.15	7.4-9.0	2-8	Low	Moderate	High
			48	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pocker: 63-----	> 5	4-6 4/	0-60	Silty clay loam.	CL, CH	A-7	0	95-100	95-100	90-95	80-90	45-55	20-30	0.06-0.2	0.14-0.17	7.9-9.0	> 4	Moderate	Moderate	High

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Preble: 64, 65---	> 5	3-5	0-10	Silt loam.	ML	A-4	0	95-100	95-100	90-95	75-85	25-35	NP	0.6-2.0	0.14-0.17	> 7.9	> 4	Low	Moderate	High
			10-55	Stratified fine sandy loam and very fine sandy loam.	SM, ML	A-4	0	95-100	95-100	70-80	45-55	20-30	NP-5	< .06	0.13-0.15	> 9.0	> 4	Low	Moderate	High
			55-65	Gravelly sand.	SP-SM	A-1	0	80-90	70-80	35-45	5-10	-	NP	2.0-6.0	0.04-0.06	> 9.0	> 4	Low	Moderate	High
Prida: 66, 67---	> 5	3.5-7	0-25	Silt loam.	ML	A-4	0	100	95-100	85-95	75-85	25-35	NP-5	0.6-2.0	0.15-0.17	6.6-8.4	> 4	Low	High	High
			25-61	Silty clay loam.	ML, MH	A-7	0	100	95-100	90-100	80-90	40-55	10-20	.06-0.2	0.15-0.17	7.4-9.0	> 4	Moderate	High	High
Pumper: 68-----	> 5	> 5	0-12	Loam.	ML	A-4	0	95-100	95-100	80-90	60-70	20-30	NP-5	0.6-2.0	0.14-0.17	7.9-9.0	< 4	Low	Moderate	High
			12-17	Very gravelly loam.	GM	A-1	0	40-50	30-40	25-35	15-25	20-30	NP-5	2.0-6.0	0.05-0.07	7.9-9.0	4-8	Low	Low	High
			17-60	Very gravelly sand.	GP-GM	A-1	0	35-45	25-35	15-25	5-10	-	NP	6.0-20	0.04-0.06	7.9-9.0	4-8	Low	Low	High
Rad: 69--------	> 5	> 5	0-6	Loamy fine sand.	SM	A-2	0	95-100	95-100	65-75	25-30	-	NP	2.0-6.0	0.07-0.10	6.6-8.4	< 4	Low	Low	High
			6-14	Loam.	ML	A-4	0	95-100	85-95	70-80	50-60	25-35	NP	2.0-6.0	0.14-0.17	7.9-9.0	> 4	Low	Moderate	High
			14-60	Silt loam and very fine sandy loam.	ML	A-4	0	90-100	85-95	75-85	45-55	25-35	NP	.06-0.2	0.14-0.17	> 9.0	> 4	Low	Moderate	High
70, 71-------			0-6	Fine sandy loam.	SM, ML	A-4	0	95-100	95-100	75-85	45-55	-	NP	2.0-6.0	0.12-0.15	6.6-8.4	2-8	Low	Moderate	High
			6-14	Loam.	ML	A-4	0	95-100	85-95	70-80	50-60	25-35	NP	2.0-6.0	0.14-0.17	7.9-9.0	> 4	Low	Moderate	High
			14-60	Silt loam and very fine sandy loam.	ML	A-4	0	90-100	85-95	75-85	45-55	25-35	NP	.06-0.2	0.14-0.17	> 9.0	> 4	Low	Moderate	High
Raglan: 72, 73--	> 5	3.5-6.0 6/	0-35	Silt loam.	ML	A-4	0	95-100	95-100	85-95	75-85	30-40	5-10	0.2-0.6	0.15-0.17	7.9-9.0	> 2	Moderate	Moderate	High
			35-52	Silty clay loam.	CL	A-6, A-7	0	95-100	95-100	95-100	85-95	35-45	15-25	0.2-0.6	0.15-0.17	> 7.9	> 8	Moderate	Moderate	High
			52-60	Very fine sandy loam.	ML	A-4	0	95-100	95-100	90-100	75-85	25-35	NP	0.6-2.0	0.14-0.16	7.9-9.0	> 8	Low	Moderate	High
Rebel: 74, 75---	> 5	> 5	0-4	Loam.	ML	A-4	0	95-100	90-100	85-95	60-70	25-35	NP	0.6-2.0	0.14-0.17	6.6-7.8	< 4	Low	Moderate	High
			4-21	Stratified sandy loam and very fine sandy loam.	SM, ML	A-4	0	95-100	90-100	75-85	45-55	20-30	NP	2.0-6.0	0.13-0.16	7.4-8.4	< 4	Low	Moderate	High
			21-60	Stratified loamy very fine sand to fine sandy loam.	SM, ML	A-4	0	90-100	85-95	75-85	40-55	20-30	NP	2.0-6.0	0.13-0.16	7.4-8.4	< 8	Low	Moderate	High
Rock outcrop:--- 7/	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rose Creek: 76--	> 5	1.5-3.5 4/	0-8	Loam.	ML	A-4	0	95-100	90-100	80-90	55-65	25-35	NP-5	0.6-2.0	0.13-0.15	7.9-9.0	< 4	Low	High	High
			8-60	Stratified loam to sand.	SM	A-4	0	90-100	80-90	65-75	35-45	20-30	NP-5	0.6-2.0	0.12-0.14	7.9-9.0	< 8	Low	High	High
Sagouspe: 77----	> 5	3-5	0-5	Loamy fine sand.	SM	A-2	0	95-100	95-100	60-70	20-30	-	NP	6.0-20	0.07-0.10	> 8.5	> 8	Low	Moderate	High
			5-60	Stratified sandy loam, loamy sand and sand.	SM	A-2	0	95-100	90-100	60-70	15-25	-	NP	6.0-20	0.07-0.10	> 8.5	> 8	Low	Moderate	High

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Table 5 - Estimated engineering properties of soils

(Absence of data indicates that the soil is too variable to be rated or that no estimate was made. The symbol > means greater than; the symbol < means less than.

Soil series and map symbol (1)	Depth to --- Hardpan or bedrock (Ft.) (2)	Depth to --- Seasonal high water table (Ft.) (3)	Depth from surface (Ins.) (4)	Classification: USDA texture (5)	Classification: UNIFIED (6)	Classification: AASHO (7)	Coarse fraction greater than 3 inches (Pct.) (8)	Pct. less than 3 ins. passing sieve--: No. 4 (4.7 mm.) (9)	No. 10 (2.0 mm.) (10)	No. 40 (0.42 mm.) (11)	No. 200 (0.074 mm.) (12)	Liquid limit (13)	Plasticity index (14)	Permeability (Ins./Hr.) (15)	Available water capacity (Ins./In.) (16)	Reaction (pH) (17)	Salinity (ECx10³ @ 25° C.) (18)	Shrink-swell potential (19)	Frost action potential (20)	Corrosivity (Untreated steel) (21)
Shabliss: 78, 79----------	1.0-1.7 1/	> 5	0-15	Very fine sandy loam.	ML	A-4	0-5	90-100	90-100	80-90	50-60	20-30	NP	0.6-2.0	0.13-0.15	> 7.9	< 4	Low	Moderate	High
			15-20	Cemented pan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			20-62	Stratified fine sandy loam, loamy sand, and gravelly loamy sand.	SM	A-4	0-5	85-95	80-90	65-75	35-45	20-30	NP	0.6-2.0	-	> 8.5	> 4	Low	Moderate	High
Shepan:--------	> 5	> 5	0-6	Stony loam.	SM	A-2	5-10	45-55	40-50	35-45	25-35	20-30	NP-5	0.6-2.0	0.07-0.12	6.6-7.3	< 2	Low	Moderate	Moderate
			6-15	Gravelly clay loam	GC, SC	A-6	0-5	65-75	60-70	55-65	40-50	30-40	15-25	0.2-0.6	0.10-0.14	6.6-7.3	< 2	Moderate	Moderate	Moderate
			15-42	Very gravelly and cobbly clay.	GC	A-7	15-25	60-70	50-60	45-55	40-50	45-55	25-35	.06-0.2	0.10-0.14	6.6-7.3	< 2	Moderate	Moderate	Moderate
			42-63	Gravelly sandy loam.	SM	A-1	0-5	70-80	60-70	35-45	15-25	-	NP	2.0-6.0	0.07-0.10	7.9-8.4	< 4	Low	Low	High
Shoken:---------	0.2-0.8 1/	>.5	0-5	Cobbly coarse sandy loam.	SM	A-1	20-25	65-75	45-55	25-35	15-20	-	NP	6.0-20	0.06-0.10	6.6-7.3	< 2	Low	Low	Moderate
			5	Weathered bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonocan: 80---- For properties of Shepan part of 80, see Shepan series.	3.3-5.0 2/	> 5	0-17	Very stony silt loam.	SM, ML	A-4	15-25	75-85	60-70	55-65	45-55	25-35	NP-5	0.6-2.0	0.12-0.15	7.9-9.0	< 2	Low	Moderate	High
			17-44	Gravelly clay loam and very gravelly clay.	GC, CL	A-6	20-30	70-80	60-70	55-65	45-55	30-40	15-25	.06-0.2	0.12-0.15	7.9-9.0	2-4	Moderate	Moderate	High
			44	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonoma: 81, 82--	> 5	2-3 4/	0-6	Silt loam.	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20	0.2-0.6	0.15-0.17	> 7.9	> 4	Moderate	High	High
			6-20	Silty clay loam.	ML, MH	A-7	0	100	100	95-100	85-95	45-55	15-25	0.2-0.6	0.15-0.17	> 7.9	> 4	Moderate	High	High
			20-60	Silt loam.	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20	0.2-0.6	0.15-0.17	> 7.9	> 4	Moderate	High	High
Spinlin: 83, 84---------- For properties of Panin part of 83 and 84, see Panin series.	2.5-3.3 2/	> 5	0-6	Very stony silt loam.	ML	A-4	15-25	75-85	70-80	65-75	55-65	25-35	NP-5	0.6-2.0	0.13-0.16	6.6-7.3	< 2	Low	Moderate	Moderate
			6-36	Cobbly clay.	CH	A-6	25-35	75-85	70-80	65-75	60-70	50-60	25-35	< .06	0.12-0.15	6.6-7.3	< 2	High	Moderate	Moderate
			36-48	Weathered bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sumine: 85----- For properties of Pernty part of 85, see Pernty series.	1.7-3.3 2/	> 5	0-6	Extremely stony loam.	SM	A-4	15-25	70-80	60-70	50-60	35-45	25-35	NP-5	0.6-2.0	0.12-0.14	6.6-7.3	< 2	Low	Moderate	Moderate
			6-28	Very gravelly clay loam.	GC	A-2, A-6	10-20	50-60	40-50	35-45	30-40	30-40	10-20	0.6-2.0	0.08-0.12	6.6-7.3	< 4	Moderate	Moderate	Moderate
			28	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trunk: 86------ For properties of Pocan part of 86, see Pocan series.	1.7-3.3 2/	> 5	0-3	Stony loam.	SM	A-4	5-10	70-80	60-70	50-60	35-45	25-35	NP-5	0.6-2.0	0.12-0.14	6.6-7.3	< 2	Low	Moderate	High
			3-30	Gravelly clay.	CL	A-6, A-7	0-5	65-75	60-70	55-65	50-60	35-45	15-25	< .06	0.14-0.16	6.6-8.4	< 4	High	Moderate	High
			30	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table 5 - Estimated engineering properties of soils
(Absence of data indicates that the soil is too variable to be rated or that no estimate was made.
The symbol > means greater than; the symbol < means less than)

Soil series and map symbol (1)	Depth to --- Hardpan or bedrock (Ft.) (2)	Depth to --- Seasonal high water table (Ft.) (3)	Depth from surface (Ins.) (4)	Classification: USDA texture (5)	Classification: UNIFIED (6)	Classification: AASHO (7)	Coarse fraction greater than 3 inches (Pct.) (8)	Pct. less than 3 ins. passing sieve-- No. 4 (4.7 mm.) (9)	No. 10 (2.0 mm.) (10)	No. 40 (0.42 mm.) (11)	No. 200 (0.074 mm.) (12)	Liquid limit (13)	Plasticity index (14)	Permeability (Ins./Hr.) (15)	Available water capacity (Ins./In.) (16)	Reaction (pH) (17)	Salinity (ECx10³ @ 25° C.) (18)	Shrink-swell potential (19)	Frost action potential (20)	Corrosivity (Untreated steel) (21)
Valmy: 87, 88, 89	> 5	> 5	0-10	Fine sandy loam.	SM	A-4	0	90-100	90-100	65-75	40-50	-	NP	2.0-6.0	0.10-0.13	> 7.9	< 8	Low	Moderate	High
			10-43	Sandy loam and fine sandy loam.	SM	A-4	0	80-90	75-85	55-65	35-45	-	NP	2.0-6.0	0.10-0.13	> 8.5	< 8	Low	Moderate	High
			43-66	Gravelly sand.	SP-SM	A-1	0	70-80	65-75	35-45	5-10	-	NP	2.0-6.0	0.08-0.11	> 8.5	< 8	Low	Low	High
Weso: 90	> 5	> 5	0-5	Loamy sand.	SM	A-2	0	95-100	90-100	60-70	15-25	-	NP	6.0-20	0.08-0.12	7.9-9.0	< 2	Low	Low	High
			5-26	Fine sandy loam and very fine sandy loam.	SM, ML	A-4	0	95-100	90-100	70-80	45-55	20-30	NP-5	0.2-0.6	0.12-0.15	7.9-9.0	4-8	Low	Moderate	High
			26-65	Stratified very gravelly loamy sand to fine sandy loam.	SM	A-1, A-2	0	65-75	60-70	35-45	20-30	-	NP	2.0-6.0	0.08-0.12	7.9-9.0	8-16	Low	Moderate	High
91	> 5	> 5	0-5	Very fine sandy loam.	ML	A-4	0	95-100	90-100	80-90	50-60	25-35	NP-5	0.6-2.0	0.14-0.16	7.9-9.0	< 2	Low	Moderate	High
			5-26	Fine sandy loam and very fine sandy loam.	SM, ML	A-4	0	95-100	90-100	65-75	45-55	20-30	NP-5	0.2-0.6	0.12-0.15	7.9-9.0	4-8	Low	Moderate	High
			26-65	Stratified very gravelly loamy sand to fine sandy loam.	SM	A-1, A-2	0	65-75	60-70	35-45	20-30	-	NP	2.0-6.0	0.08-0.12	7.9-9.0	8-16	Low	Moderate	High
92	> 5	> 5	0-5	Very fine sandy loam.	ML	A-4	0	95-100	90-100	80-90	50-60	25-35	NP-5	0.6-2.0	0.14-0.16	7.9-9.0	< 2	Low	Moderate	High
			5-40	Fine sandy loam and sandy loam.	SM	A-4	0	85-95	75-85	55-65	35-45	20-30	NP-5	0.2-0.6	0.12-0.15	7.9-9.0	4-8	Low	Moderate	High
			40-60	Very gravelly sand and very gravelly loamy sand.	GP-GM	A-1	0	40-50	35-45	20-30	5-10	-	NP	> 20	0.04-0.06	7.9-9.0	4-8	Low	Low	High
Winada:	1.7-2.5 1/	> 5	0-10	Very stony loam.	GM	A-2	5-15	50-60	40-50	35-45	25-35	25-35	NP-5	0.6-2.0	0.06-0.10	6.6-7.3	< 2	Low	Moderate	Moderate
			10-20	Gravelly clay loam.	GC	A-2, A-6	0-5	50-60	45-55	40-50	30-40	30-40	10-20	0.2-0.6	0.06-0.10	6.6-7.8	< 2	Moderate	Moderate	Moderate
			20	Weathered bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Winevada:	2.5-3.3 2/	> 5	0-3	Stony loam.	SM	A-4	5-10	70-80	60-70	50-60	35-45	25-35	NP	0.6-2.0	0.12-0.15	6.6-7.3	< 2	Low	Moderate	Moderate
			3-35	Gravelly silt loam.	SC-SM, SC CL-ML, CL	A-4, A-6	0-5	70-80	60-70	55-65	45-55	25-35	5-15	0.6-2.0	0.12-0.16	6.6-7.3	< 2	Moderate	Moderate	Moderate
			35	Bedrock.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FOOTNOTES:

1/ Rippable.

2/ Hard - not rippable.

3/ Lime nodules.

4/ Occasionally flooded.

5/ Rarely flooded.

6/ Water table in 72 is > 5 feet.

7/ Outcrops of hard bedrock at or above the surface. Occurs in associations with Mullyon and Percoun series.

Engineering interpretations of soils

The estimated interpretations in table 6 are based on the engineering properties of soils shown in table 5, and others nearby or adjoining, and on the experience of engineers and soil scientists with soils. In table 6, ratings are used to summarize limitations or suitability of the soils for all listed purposes other than for drainage of cropland and pasture, irrigation, ponds and reservoirs, embankments, dikes and levees. For these particular uses, table 6 lists those soil features not to be overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. Slight means soil properties generally favorable for the rated use, or in other words, limitations that are minor and easily overcome. Moderate means that some soil properties are unfavorable but can be overcome or modified by special planning and design. Severe means soil properties so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance.

Soil suitability is rated by the terms good, fair, and poor, which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe.

Following are explanations of some of the columns in table 6.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect

both absorption or effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and slso the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteris to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slope, and if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, as for example, excavations for pipelines, sewer lines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 6, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated the ratings in table 6 apply only to a depth of about 6 feet, and therefore limitation ratings of slight or moderate may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 to 15 feet, but regardless of that, every site should be investigated before it is selected.

Local roads and streets, as rated in table 6, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or

cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep. Soil properties that most affect design and construction of roads and streets are load supporting capacity and stability of the sugrade, and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material, and also the shrink-swell potential, indicate traffic supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Roadfill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage, and (2) the relative ease of excavating the material at borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 6 provide guidance about where to look for probable sources. A soil rated as a good or fair source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality of the deposit.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or its response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion or soil blowing; soil texture; content of stones; accumulations of salts and alkali; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants; and need for drainage, or depth to water table or bedrock.

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Table 6 - Interpretations of engineering properties

(Absence of entry indicates that no interpretation was made).

Soil series and map symbols (1)	Degree and kind of limitation for -----								Suitability as source of material for -----				Soil features affecting -----		
	Septic tank absorption fields 1/ (2)	Sewage lagoons (3)	Sanitary landfill (trench) 2/ (4)	Sanitary landfill (area) 2/ (5)	Daily cover for sanitary landfill 8/ (suitability) (6)	Shallow excavation (7)	Dwellings without basements 3/ 5/ (8)	Local roads and streets 5/ (9)	Roadfill 8/ (10)	Sand 8/ (11)	Gravel 8/ (12)	Topsoil (13)	Pond reservoir area (14)	Embankments, dikes, and levees (15)	Irrigation (16)
Adelaide: 11, 13	Severe: cemented pan; percs slowly.	Moderate: slope.	Moderate: cemented pan.	Slight.	Poor: thin layer.	Moderate: cemented pan.	Moderate: shrink-swell.	Moderate: cemented pan; shrink-swell.	Poor: thin layer.	Poor.	Poor.	Fair: thin layer.	Cemented pan; slope.	Low strength; thin layer.	Slope; rooting depth.
12, 14	Severe: cemented pan; percs slowly.	Slight.	Moderate: cemented pan.	Slight.	Poor: thin layer.	Moderate: cemented pan.	Moderate: shrink-swell.	Moderate: cemented pan; shrink-swell.	Poor: thin layer.	Poor.	Poor.	Fair: thin layer; unit 14 is saline-alkali	Cemented pan.	Low strength; thin layer.	Rooting depth.
15	Severe: cemented pan; percs slowly.	4 to 7 percent, Moderate: slope. 7 to 15 percent, Severe: slope.	Moderate: cemented pan.	4 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	Poor: thin layer.	4 to 8 percent Moderate: stones; cemented pan. 8 to 15 percent, Moderate: slopes; stones; cemented pan.	4 to 8 percent, Moderate: shrink-swell. 8 to 15 percent, Moderate: shrink-swell; slope.	4 to 8 percent, Moderate: cemented pan; shrink-swell. 8 to 15 percent, Moderate: slope; cemented pan; shrink-swell.	Poor: thin layer.	Poor.	Poor.	Poor: stones.	Cemented pan; slope.	Low strength; thin layer.	Complex slope; rooting depth.
Benin: 16, 17	Severe: percs slowly.	Slight.	Severe: too clayey.	Slight.	Poor: too clayey.	Severe: too clayey.	Severe: shrink-swell.	Severe: low strength; shrink-swell.	Poor: low strength; shrink-swell.	Unsuited.	Unsuited.	Poor: too clayey.	Favorable.	Low strength; compressible.	Unit 16, soil blowing, percs slowly. Unit 17, percs slowly.
18	Severe: percs slowly; slope.	Severe: slope.	Severe: too clayey; slope.	Severe: slope.	Poor: too clayey; slope.	Severe: too clayey; slope.	Severe: shrink-swell; slope.	Severe: low strength; slope; shrink-swell.	Poor: low strength; shrink-swell.	Unsuited.	Unsuited.	Poor: slope; too clayey.	Slope.	Low strength; compressible.	Slope; percs slowly.
19	Severe: percs slowly.	Slight.	Severe: too clayey.	Slight.	Poor: too clayey.	Severe: too clayey.	Severe: shrink-swell.	Severe: low strength; shrink-swell.	Poor: low strength; shrink-swell.	Unsuited.	Unsuited.	Poor: excess salt; too clayey.	Favorable.	Low strength; compressible.	Excess salt; excess alkali; percs slowly.
Blackhawk: 20	Severe: cemented pan.	0 to 2 percent, Slight. 2 to 4 percent, Moderate: slope.	Severe: cemented pan.	Slight.	Poor: thin layer.	Moderate: cemented pan.	Moderate: cemented pan.	Moderate: cemented pan.	Poor: low strength; thin layer.	Fair.	Poor.	Fair: thin layer.	Cemented pan.	Low strength; piping.	0 to 2 percent, rooting depth. 2 to 4 percent, rooting depth; slope.

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Bliss: 21-----	Severe: cemented pan.	Moderate: slope.	Severe: cemented pan.	Slight.	Fair: thin layer.	Moderate: cemented pan.	Moderate: cemented pan.	Moderate: cemented pan.	Poor: thin layer.	Unsuited.	Unsuited.	Good.	Cemented pan; slope.	Low strength; piping.	Rooting depth; slope.
22---------- For interpretations of Chiara part of 22, see Chiara series.	Severe: cemented pan; slope.	Severe: slope.	Moderate: cemented pan.	Moderate: slope.	Fair: thin layer; slope.	Moderate: cemented pan; slope.	Moderate: slope; cemented pan.	Moderate: slope; cemented pan.	Poor: thin layer.	Unsuited.	Unsuited.	Fair: slope.	Cemented pan; slope.	Low strength; piping.	Complex slope; rooting depth.
Chiara: 23---- 6/	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Slight.	Poor: thin layer.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: thin layer.	Unsuited.	Unsuited.	Fair: stones.	Cemented pan; slope.	Low strength; thin layer.	Rooting depth; slope.
Dryn: 24------ For interpretations for Winada part of 24, see Winada series.	Severe: slope.	Severe: slope.	Severe: slope; depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Poor: slope; shrink-swell.	Unsuited.	Unsuited.	Poor: slope; stones.	Slope.	Stones.	Slope.
Duffer: 25, 26----------	Severe: wet; percs slowly.	Severe: wet.	Severe: wet.	Severe: wet.	Poor: wet.	Severe: wet.	Severe: wet.	Severe: wet; low strength; frost action.	Poor: wet; low strength; frost action.	Unsuited.	Unsuited.	Poor: wet; excess salt; excess alkali.	Favorable.	Low strength; compressible.	Wet; excess salt; excess alkali.
Dun Glen: 27, 28, 29-------	Slight.	0 to 2 percent, Moderate: seepage. 2 to 4 percent, Moderate: slope; seepage.	Slight.	Slight.	Good.	Slight.	Moderate: low strength.	Moderate: low strength.	Fair: low strength.	Unsuited. 7/	Unsuited. 7/	Good.	Seepage.	Low strength; piping.	0 to 2 percent, Favorable. 2 to 4 percent, slope.
Golcondoa: 30--	Severe: percs slowly.	Moderate: slope.	Severe: cemented pan.	Slight.	Fair: thin layer.	Moderate: cemented pan.	Moderate: shrink-swell.	Severe: low strength.	Poor: low strength; thin layer.	Unsuited.	Unsuited.	Fair: thin layer.	Cemented pan; slope.	Low strength; compressible.	Rooting depth; slope.
31----------	Severe: slope; percs slowly.	Severe: slope.	Severe: cemented pan.	Moderate: slope.	Fair: thin layer; slope.	Moderate: slope; cemented pan.	Moderate: slope; shrink-swell.	Severe: low strength.	Poor: low strength; thin layer.	Unsuited.	Unsuited.	Fair: slope; thin layer.	Cemented pan; slope.	Low strength; compressible.	Rooting depth; slope.

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	Septic tank absorption fields (2) 1/	Sewage lagoons (3)	Sanitary landfill (trench) (4) 2/	Sanitary landfill (area) (5) 2/	Daily cover for sanitary landfill 8/ (suitability) (6)	Shallow excavation (7)	Dwellings without basements (8) 3/ 5/	Local roads and streets (9) 5/	Roadfill (10) 8/	Sand (11) 8/	Gravel (12) 8/	Topsoil (13)	Pond reservoir area (14)	Embankments, dikes, and levees (15)	Irrigation (16)
Goldrun: 32, 33, 34, 35, 36, 37------- For interpretations for Benin part of 35 and 36, and Preble part of 37, see Benin and Preble series.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	0 to 8 percent, Severe: seepage. 8 to 15 percent, Severe: seepage; slope.	Severe: too sandy.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	Poor: too sandy.	Severe: Cutbanks cave.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	Good.	Poor.	Unsuited.	Poor: too sandy.	0 to 2 percent, seepage. 2 to 15 percent, seepage; slope.	Piping; seepage; erodes easily.	Droughty; soil blowing; fast intake.
Golsum: 38---- For interpretation for Graley part of 38, see Graley series.	Severe: slope; depth to rock; percs slowly.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Severe: slope.	Poor: slope; thin layer.	Severe: slope; depth to rock; too clayey.	Severe: slope; shrink-swell.	Severe: slope; shrink-swell.	Poor: slope; shrink-swell.	Unsuited.	Unsuited.	Poor: slope; stones.	Slope; depth to rock.	Thin layer; low strength.	Slope; rooting depth; stones.
Gosumi---------	Severe: slope; depth to rock; percs slowly.	Severe: slope.	Severe: slope; depth to rock.	Severe: slope.	Poor: slope; too clayey.	Severe: slope; too clayey.	Severe: slope; shrink-swell.	Severe: slope; shrink-swell.	Poor: slope; shrink-swell.	Unsuited.	Unsuited.	Poor: slope; stones; thin layer.	Slope.	Low strength.	Slope; percs slowly; stones.
Graley: 39---- For interpretations of Percoun part of 39, see Percoun series.	Severe: depth to rock; slope; percs slowly.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope; thin layer.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Poor: slope; thin layer.	Unsuited.	Unsuited.	Poor: slope; thin layer; stones.	Depth to rock; slope.	Stones; thin layer.	Rooting depth; slope; stones.
Granyon: 40--- For interpretations of Shoken part of 40, see Shoken series.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope; stones.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope; thin layer.	Poor.	Unsuited.	Poor: slope; stones.	Depth to rock; slope.	Seepage; stones; thin layer.	Droughty; rooting depth; slope.
Harcany: 41--- For interpretations for Winevada part of 41, see Winevada series.	Severe: slope.	Severe: slope; seepage.	Severe: slope.	Severe: slope.	Poor: slope.	Severe: slope; stones.	Severe: slope.	Severe: slope.	Poor: slope.	Unsuited.	Unsuited.	Poor: slope; stones.	Slope.	Piping. seepage.	Slope; droughty.

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	Septic tank absorption fields 1/ (2)	Sewage lagoons (3)	Sanitary landfill (trench) 2/ (4)	Sanitary landfill (area) 2/ (5)	Daily cover for sanitary landfill 8/ (suitability) (6)	Shallow excavation (7)	Dwellings without basements 3/ 5/ (8)	Local roads and streets 5/ (9)	Roadfill 8/ (10)	Sand 8/ (11)	Gravel 8/ (12)	Topsoil (13)	Pond reservoir area (14)	Embankments, dikes, and levees (15)	Irrigation (16)
Humboldt: 42, 43, 44, 45----	Severe: floods wet; percs slowly.	Severe: wet; floods.	Severe: floods; wet.	Severe: floods; wet.	Poor: wet; too clayey.	Severe: floods; wet too clayey.	Severe: floods; wet; shrink-swell.	Severe: shrink-swell; wet; floods.	Poor: wet; low strength; shrink-swell.	Unsuited.	Unsuited.	Poor: wet; too clayey; excess salt.	Favorable.	Low strength; compress-ible.	Wet; floods; percs slowly.
Iver----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.	Unsuited.	Unsuited.	Poor: slope; small stones.	Slope.	Seepage.	Slope.
McConnel: 46---	Slight.	Severe: seepage.	Severe: small stones.	Slight.	Poor: thin layer.	Severe: cut-banks cave.	Slight.	Slight.	Good.	Fair.	Fair.	Good.	Seepage.	Seepage.	Droughty.
47----------	Slight.	Severe: seepage.	Severe: small stones.	Slight.	Poor: thin layer.	Severe: cut-banks cave.	Slight.	Slight.	Good.	Fair.	Fair.	Good.	Seepage; slope.	Seepage.	Droughty; slope.
48----------	Severe: slope.	Severe: seepage; slope.	Severe: small stones.	Severe: slope.	Poor: slope; thin layer.	Severe: slope; cut-banks cave.	Severe: slope.	Severe: stones; slope.	Fair: slope.	Fair.	Fair.	Poor: stones; slope.	Seepage; slope.	Seepage.	Droughty; slope.
Mullyon: 49---- For interpre-tations of Rock outcrop part of 49, see Rock outcrop.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Severe: slope.	Poor: slope; thin layer.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Poor: slope; thin layer.	Unsuited.	Unsuited.	Poor: slope; stones.	Depth to rock; slope.	Low strength; piping; thin layer.	Rooting depth; slope.
Needle Peak: 50----------	Severe: floods.	Moderate: seepage.	Moderate: floods.	Moderate: floods.	Good.	Moderate: floods.	Severe: floods.	Moderate: shrink-swell; low strength.	Fair: low strength; shrink-swell.	Unsuited.	Unsuited.	Fair: excess salt.	Favorable.	Low strength; piping.	Floods.
51----------	Severe: floods.	Moderate: seepage.	Moderate: floods.	Moderate: floods.	Good.	Moderate: floods.	Severe: floods.	Moderate: shrink-swell low strength.	Fair: low strength; shrink-swell.	Unsuited.	Unsuited.	Poor: excess salt; excess alkali.	Favorable.	Low strength; piping.	Excess salt; floods.
Nevtah: 52-----	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Severe: slope.	Fair: slope.	Unsuited.	Unsuited.	Poor: slope; stones.	Depth to rock; slope.	Low strength; piping.	Slope; stones.
Ninch: 53------	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slopes.	0 to 8 percent, Severe: seepage. 8 to 15 percent, Severe: seepage; slope.	Severe: too sandy.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	Poor: too sandy.	Severe: cut-banks cave.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	0 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	Fair: low strength.	Poor.	Unsuited.	Poor: too sandy.	0 to 2 percent, seepage. 2 to 15 percent, slope; seepage.	Low strength; piping; seepage.	Droughty; fast intake; soil blowing.

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Nomara: 54----- For interpretations of Gosumi part of 54, see Gosumi series.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope; thin layer.	Severe: depth to rock; slope.	Severe: slope.	Severe: slope.	Poor: slope.	Unsuited.	Unsuited.	Poor: stones; slope.	Depth to rock; slope.	Low strength.	Slope; stones.
Orovada: 56, 58, 59--------	Slight.	0 to 2 percent, Moderate: seepage. 2 to 4 percent, Moderate: seepage; slope.	Slight.	Slight.	Good.	Slight.	Moderate: low strength.	Moderate: low strength.	Fair: low strength.	Poor.	Poor.	Good. 9/	Seepage.	Low strength; piping.	0 to 2 percent, Favorable. 2 to 4 percent, slope.
Panin----------	4 to 15 percent, Severe: depth to rock. 15 to 30 percent, Severe: depth to rock; slope.	4 to 8 percent, Severe: depth to rock. 8 to 30 percent, Severe: depth to rock; slope.	4 to 25 percent, Severe: depth to rock. 25 to 30 percent, Severe: depth to rock; slope.	4 to 8 percent, Slight. 8 to 15 percent, Moderate: slope. 15 to 30 percent, Severe: slope.	4 to 15 percent, Severe: stones. 15 to 30 percent, Severe: stones; slope.	4 to 15 percent, Severe: depth to rock; stones. 15 to 30 percent, Severe: depth to rock; stones; slope.	4 to 15 percent, Moderate: depth to rock. 15 to 30 percent, Severe: slope.	4 to 15 percent, Moderate: depth to rock. 15 to 30 percent, Severe: slope.	Poor: thin layer.	Unsuited.	Unsuited.	4 to 15 percent, Poor: stones. 15 to 30 percent, Poor: stones; slope.	Depth to rock; slope.	Thin layer; stones.	Rooting depth; slope.
Percoun: 60----	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Severe: slope; depth to rock; stones.	Severe: slope.	Poor: slope; stones; too clayey.	Severe: slope; depth to rock; too clayey.	Severe: slope; stones.	Severe: slope.	Severe: slope.	Unsuited.	Unsuited.	Poor: slope; stones.	Depth to rock; slope.	Stones.	Percs slowly; slope; stones.
Pernty: 61, 62-- For interpretations of Iver part of 61 and 62, see Iver series	Severe: depth to rock; stones; slope.	Severe: depth to rock; slope.	Severe: depth to rock; stones; slope.	Severe: slope.	Poor: stones; slope; thin layer.	Severe: depth to rock; stones; slope.	Severe: depth to rock; stones; slope.	Severe: depth to rock; slope.	Poor: slope; thin layer.	Unsuited.	Unsuited.	Poor: stones; slope; thin layer.	Depth to rock; slope.	Stones; thin layer.	Rooting depth; slope; stones.
Pocan----------	Severe: slope.	Severe: slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.	Unsuited.	Unsuited.	Poor: stones; slope.	Slope; depth to rock.	Stones; low; strength; piping.	Slope; stones.

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Pocker: 63------	Severe: percs slowly; floods.	Slight. 4/	Moderate: floods; wet.	Moderate: floods.	Fair: too clayey.	Moderate: floods.	Severe: floods frost action.	Moderate: floods; low strength; frost action.	Fair: low strength; frost action.	Unsuited.	Unsuited.	Poor: excess alkali; excess salt.	Favorable.	Low strength; shrink-swell	Excess alkali; excess salt; percs slowly.
Preble: 64, 65--	Severe: wet; percs slowly.	Severe: wet.	Severe: wet.	Severe: wet.	Good.	Moderate: wet.	Moderate: wet; frost action; low strength.	Moderate: wet; frost action; low strength.	Poor: frost action; low strength.	Good.	Unsuited.	Poor: excess alkali; excess salt.	Favorable.	Low strength; piping.	Percs slowly.
Prida: 66, 67---	Severe: percs slowly.	Slight.	Severe: wet.	Slight.	Good.	Moderate: wet.	Severe: low strength; frost action.	Severe: low strength; frost action.	Poor: low strength; frost action.	Unsuited.	Unsuited.	Poor: excess alkali; excess salt.	Favorable.	Low strength; piping; compress-ible.	Slow intake; percs slowly; excess salt; excess alkali.
Pumper: 68-----	Slight.	Severe: seepage.	Severe: too sandy; small stones.	Slight.	Poor: thin layer.	Severe: cut-banks cave.	Slight.	Slight.	Good.	Good.	Good.	Fair: thin layer.	Seepage.	Seepage.	Droughty; seepage.
Rad: 69, 70, 71----------	Severe: percs slowly.	0 to 2 percent, Slight. 2 to 8 percent, Moderate: slope.	Slight.	Slight.	Good.	Slight.	Moderate: low strength.	Moderate: low strength.	Fair: low strength.	Unsuited.	Unsuited.	Good. 10/	0 to 2 percent, Favorable. 2 to 8 percent, slope.	Low strength; piping; compress-ible.	0 to 2 percent, soil blowing. 2 to 8 percent, soil blowing; slope.
Raglan: 72-----	Severe: percs slowly.	Slight.	Severe: wet.	Slight.	Fair: thin layer.	Slight.	Moderate: low strength; shrink-swell.	Moderate: low strength; shrink-swell; frost action.	Fair: low strength; shrink-swell.	Unsuited.	Unsuited.	Fair: thin layer; excess salt; excess alkali.	Favorable.	Low strength; piping; compress-ible.	Slow intake; percs slowly; wet.
73----------	Severe: percs slowly.	Slight.	Moderate: too clayey.	Slight.	Fair: thin layer.	Slight.	Moderate: low strength; shrink-swell.	Moderate: low strength; shrink-swell.	Fair: low strength; shrink-swell.	Unsuited.	Unsuited.	Poor: excess alkali; excess salt.	Favorable.	Low strength; compress-ible; piping.	Excess salt; excess alkali; slow intake.

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Rebel: 74, 75---	Slight.	0 to 2 percent, Slight. 2 to 4 percent, Moderate: slope.	Slight.	Slight.	Good.	Slight.	Slight.	Moderate: low strength.	Fair: low strength.	Poor.	Poor.	Good.	Seepage.	Low strength; piping.	Favorable.
Rock outcrop---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rose Creek: 76--	Severe: floods; wet.	Severe: wet; floods.	Severe: floods; wet.	Severe: floods; wet.	Poor: wet.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet frost action.	Poor: wet; frost action.	Unsuited.	Unsuited.	Poor: wet.	Seepage.	Low strength; piping.	Floods; wet.
Sagouspe: 77---	Severe: wet.	Severe: wet; seepage.	Severe: wet.	Severe: wet.	Fair: too sandy.	Severe: cut-banks cave; wet.	Moderate: wet.	Moderate: wet.	Poor: wet.	Poor.	Unsuited.	Poor: excess salt; excess alkali; too sandy.	Seepage.	Piping; seepage.	Excess salt; excess alkali; soil blowing; wet.
Shabliss: 78, 79----------	Severe: cemented pan.	2 to 8 percent, Severe: cemented pan. 8 to 15 percent, Severe: cemented pan; slope.	Moderate: cemented pan.	2 to 8 percent, Slight. 8 to 15 percent, Moderate: slope.	Poor: thin layer.	2 to 8 percent, Moderate: cemented pan. 8 to 15 percent, Moderate: cemented pan; slope.	2 to 8 percent, Moderate: cemented pan. 8 to 15 percent, Moderate: cemented pan; slope.	2 to 8 percent, Moderate: cemented pan; low strength. 8 to 15 percent, Moderate: cemented pan; low strength; slope.	Poor: low strength; thin layer.	Poor.	Poor.	Fair: thin layer.	Cemented pan; slope; seepage.	Low strength; piping.	Rooting depth; slope.
Shepan---------	Severe: percs slowly; slope.	Severe: slope.	Severe: slope; too clayey; small stones.	Severe: slope.	Poor: slope; thin layer.	Severe: slope; too clayey; small stones.	Severe: slope.	Severe: slope.	Poor: slope.	Unsuited.	Unsuited.	Poor: thin layer; stones; slopes.	Slope	Low strength.	Slope; percs slowly; stones.
Shoken---------	Severe: slope; depth to rock.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope; thin layer.	Severe: depth to rock; slope.	Severe: slope; depth to rock.	Severe: slope; depth to rock.	Poor: slope; thin layer.	Unsuited.	Unsuited.	Poor: slope; thin layer; stones.	Depth to rock; slope.	Thin layer.	Rooting depth; slope.
Sonocan: 80---- For interpretations of Shepan part of 80, see Shepan series.	Severe: percs slowly; slope.	Severe: slope.	Severe: stones; slope.	Severe: slope.	Poor: stones; slope; thin layer.	Severe: stones; slope.	Severe: slope; low strength.	Severe: slope; low strength.	Poor: slope; low strength.	Unsuited.	Unsuited.	Poor: slope; stones.	Slope.	Low strength.	Slope; percs slowly.

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	Septic tank absorption fields 1/	Sewage lagoons	Sanitary landfill (trench) 2/	Sanitary landfill (area) 2/	Daily cover for sanitary landfill 8/ (suitability)	Shallow excavations	Dwellings without basements 3/ 5/	Local roads and streets 5/	Roadfill 8/	Sand 8/	Gravel 8/	Topsoil	Pond reservoir area	Embankments, dikes and levees	Irrigation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Sonoma: 81, 82--	Severe: floods; wet; percs slowly.	Severe: floods; wet.	Severe: floods; wet.	Severe: floods; wet.	Poor: wet.	Severe: floods; wet.	Severe: floods; wet; frost action; low strength.	Severe: floods; wet; low strength; frost action.	Poor: wet; frost action; low strength.	Unsuited.	Unsuited.	Poor: wet; excess salt; excess alkali.	Favorable.	Low strength; compressible; hard to pack.	Floods; wet; excess salt; excess alkali.
Spinlin: 83, 84---------- For interpretations of Panin part of 83 and 84, see Panin series.	4 to 15 percent, Severe: percs slowly; depth to rock. 15 to 30 percent, Severe: slope; percs slowly; depth to rock.	4 to 8 percent, Severe: depth to rock; stones. 8 to 30 percent, Severe: slope; depth to rock; stones.	4 to 25 percent, Severe: depth to rock; too clayey; stones. 25 to 30 percent, Severe: slope; depth to rock; too clayey; stones.	4 to 8 percent, Slight. 8 to 15 percent, Moderate: slope. 15 to 30 percent, Severe: slope.	4 to 15 percent, Poor: thin layer; stones. 15 to 30 percent, Poor: thin layer; slope; stones.	4 to 15 percent, Severe: too clayey; depth to rock. 15 to 30 percent, Severe: too clayey; slope; depth to rock.	4 to 15 percent, Severe: shrink-swell; stones. 15 to 30 percent, Severe: shrink-swell; slope; stones.	4 to 15 percent, Severe: shrink-swell. 15 to 30 percent, Severe: shrink-swell; slope.	4 to 25 percent, Poor: shrink-swell. 25 to 30 percent, Poor: shrink-swell; slope.	Unsuited.	Unsuited.	4 to 15 percent, Poor: stones; thin layer. 15 to 30 percent, Poor: stones; thin layer; slope.	Depth to rock; slope.	Low strength; compressible; shrink-swell	Slope; percs slowly; stones.
Sumine: 85---- For interpretations for Pernty part of 85, see Pernty series.	Severe: stones; slope; depth to rock.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope; thin layer; stones.	Severe: slope; depth to rock; too clayey; stones.	Severe: slope; stones.	Severe: slope.	Poor: slope.	Unsuited.	Unsuited.	Poor: stones; slope; thin layer.	Depth to rock; slope.	Stones.	Rooting depth; slope; stones.
Trunk: 86----- For interpretations for Pocan part of 86, see Pocan series.	Severe: depth to rock; percs slowly; slope.	Severe: depth to rock; slope.	Severe: depth to rock; slope; too clayey.	Severe: slope.	Poor: slope; thin layer.	Severe: depth to rock; slope; too clayey.	Severe: shrink-swell; slope.	Severe: shrink-swell; slope.	Poor: shrink-swell; slope.	Unsuited.	Unsuited.	Poor: slope; thin layer.	Depth to rock; slope.	Shrink-swell; compressible.	Rooting depth; slope; percs slowly.
Valmy: 87, 88, 89-------	Slight.	Severe: seepage.	Slight.	Slight.	Good.	Slight.	Slight.	Moderate: low strength.	Fair: low strength.	Good.	Poor.	Good. 11/	Seepage	Piping; low strength.	Favorable.
Weso: 90, 91, 92-------	Slight.	Slight.	Slight.	Slight.	Slight.	Slight.	Slight.	Moderate: low strength.	Fair: low strength.	Poor. 12/	Unsuited. 12/	Good. 13/	Favorable.	Piping; low strength; erodes easily.	Favorable. 14/

Date January 1975

Sonoma Planning Unit Nevada

Table 6 - Interpretations of engineering properties

(Absence of entry indicates that no interpretation was made).

Soil series and map symbols (1)	Degree and kind of limitation for -----							Suitability as source of material for -----					Soil features affecting -----		
	Septic tank absorption fields 1/ (2)	Sewage lagoons (3)	Sanitary landfill (trench) 2/ (4)	Sanitary landfill (area) 2/ (5)	Daily cover for sanitary landfill 8/ (suitability) (6)	Shallow excavations (7)	Dwellings without basements 3/ 5/ (8)	Local roads and streets 5/ (9)	Roadfill 8/ (10)	Sand 8/ (11)	Gravel 8/ (12)	Topsoil (13)	Pond reservoir area (14)	Embankments, dikes and levees (15)	Irrigation (16)
Winada----------	Severe: depth to rock; stones; slope.	Severe: depth to rock; slope.	Severe: depth to rock; stones; slope.	Severe: slope.	Poor: stones; slope; thin layer.	Severe: depth to rock; stones; slope.	Severe: slope.	Severe: slope.	Poor: slope; thin layer.	Unsuited.	Unsuited.	Poor: stones; slope; thin layer.	Depth to rock; slope.	Stones; thin layer.	Rooting depth; slope; stones.
Winevada--------	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: depth to rock; slope.	Severe: slope.	Poor: slope.	Severe: depth to rock; slope.	Severe: slope.	Severe: slope; low strength.	Poor: slope; low strength.	Unsuited.	Unsuited.	Poor: stones; slope.	Depth to rock; slope.	Low strength; piping.	Rooting depth; slope; stones.

FOOTNOTES:

1/ Based on assumption that tile line is at 24-inch depth.

2/ Permeability not used as criteria for arid and semiarid soils.

3/ Based on assumption that footings will be at 24-inch depth.

4/ Flooding not likely to enter or damage lagoon.

5/ Frost action used as criteria only for wet soils.

6/ For Chiara fine sandy loam, 15 to 30 percent slopes, ratings for all uses will be modified by slope.

7/ Map unit 29 has poor suitability for sand and gravel.

8/ Area rehabilitation will be a problem for arid and semiarid soils.

9/ Gravelly surface texture in unit 58 and 59 will rate as fair.

10/ Unit 69 with loamy fine sand surface rated fair.

11/ Unit 88 and 89 will rate fair due to slight salinity.

12/ Unit 92 has good sand and gravel below 40-inch depth.

13/ Unit 90 has loamy sand surface about 5 inches thick which will rate fair.

14/ Unit 90 has loamy sand surface which is subject to blowing and has fast intake rate.

Use of Soil for Recreational Development

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 7, the soils are rated according to limitations that affect their suitability for camp areas, playgrounds, picnic areas, and paths and trails.

In table 7 the soils are rated as having slight, moderate or severe limitations for the specified uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained. A limitation of slight means that soil properties are generally favorable and limitations are so minor that they can be easily overcome. A moderate limitation can be overcome or modified by planning, by design, or by special maintenance. A severe limitation means that costly soil relamation, special design, intense maintenance, or a combination of these, is required.

Camp areas are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops,

good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Picnic areas are attractive natural or landscaped tracts used primarily for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry; are free of flooding during the season of use; do not have slopes or stoniness that greatly decreases cost of leveling sites or of building access roads.

Paths and trails are used for local and cross country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded not more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

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TABLE 7
INTERPRETATIONS OF SOIL PROPERTIES FOR RECREATION

Sonoma Planning Unit Nevada

Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Adelaide: 11, 12, 13, 14----------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 6 percent: Moderate - dusty, slope. 6 to 8 percent: Severe - slope.
15----------	Moderate: dusty, stones, slope.	Moderate: dusty, stones.	4 to 8 percent: Moderate - dusty. 8 to 15 percent: Moderate - dusty, slope.	4 to 6 percent: Moderate - dusty, slope, stones. 6 to 15 percent: Severe - slope.
Benin: 16-------- 17, 19---------- 18----------	Severe: soil blowing. Moderate: dusty. Severe: slope.	Severe: soil blowing. Moderate: dusty. Severe: slope.	Severe: soil blowing. Moderate: dusty. Severe: slope.	Severe: soil blowing. Moderate: dusty. Severe: slope.
Blackhawk: 20----	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 4 percent: Moderate - slope, dusty.
Bliss: 21--------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	2 to 6 percent: Moderate - dusty, slope. 6 to 8 percent: Severe - slope.

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TABLE 7
INTERPRETATIONS OF SOIL PROPERTIES FOR RECREATION

Sonoma Planning Unit Nevada Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Bliss (continued)				
22----------	Moderate: dusty, slope.	Moderate: dusty.	Moderate: dusty. slope.	Severe: dusty, slope.
Chiara part of 22----------	Severe: slope.	15 to 25 percent: Moderate - slope. 25 to 30 percent: Severe - slope.	Severe: slope.	Severe: slope.
Chiara: 23-------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty, slope, stones.
Dryn: 24---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, stones.
Winada part of 24----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, stones.
Duffer: 25, 26---	Moderate: wet.	Moderate: wet.	Moderate: wet.	Moderate: wet.
Dun Glen: 27, 28, 29----------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 4 percent: Moderate - dusty, slope
Golconda: 30, 31-	2 to 8 percent: Moderate - dusty. 8 to 15 percent: Moderate - dusty, slope.	2 to 15 percent: Moderate - dusty.	2 to 8 percent: Moderate - dusty. 8 to 15 percent: Moderate - dusty, slope.	2 to 6 percent: Moderate - slope, dusty. 6 to 15 percent: Severe - slope.

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TABLE 7

INTERPRETATIONS OF SOIL PROPERTIES FOR RECREATION

Sonoma Planning Unit Nevada Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Goldrun: 32, 33, 34, 35, 36, 37---	Severe: too sandy, soil blowing.	Severe: too sandy, soil blowing.	Severe: too sandy, soil blowing.	0 to 6 percent: Severe - too sandy, soil blowing 6 to 15 percent: Severe - too sandy, soil blowing, slope.
Benin part of 35, 35----------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
Preble part of 37----------	Moderate: percs slowly.	Slight.	Slight.	Moderate: percs slowly.
Golsum: 38-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, stones.
Graley part of 38----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, stones.
Graley: 39-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, stones.
Percoun part of 39----------	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.
Granyon: 40------	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.
Shoken part of 40----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, stones.

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Sonoma Planning Unit Nevada

Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Harcany: 41------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, stones.
Winevada part of 41----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, stones.
Humboldt: 42-----	Severe: floods, wet.	Moderate: wet.	Moderate: floods, wet.	Moderate: floods, wet.
43, 44, 45------	Severe: floods, wet.	Severe: wet.	Severe: wet.	Severe: wet.
McConnel: 46, 47-	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	4 to 6 percent: Moderate - dusty, slope. 6 to 8 percent: Severe: slope.
48----------	Severe: slope.	15 to 25 percent: Moderate - slope. 25 to 30 percent: Severe - slope.	Severe: slope.	Severe: slope.
Mullyon: 49------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.
Needle Peak: 50, 51----------	Moderate: dusty, floods, percs slowly.	Slight.	Moderate: dusty.	Moderate: dusty.
Nevtah: 52-------	Severe: slope.	15 to 25 percent: Moderate - slope. 25 to 30 percent: Severe - slope.	Severe: slope.	Severe: slope.

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Sonoma Planning Unit Nevada

Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Ninch: 53--------	Severe: to sandy, soil blowing.	Severe: too sandy, soil blowing.	Severe: too sandy, soil blowing.	Severe: too sandy, soil blowing.
Nomara: 54-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gosumi part of 54----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Orovada: 56, 58, 59----------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 4 percent: Moderate - dusty, slope.
Percoun: 60------	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.
Pernty: 61, 62---	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, depth to rock, stones.
Iver part of 61, 62----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pocker: 63-------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
Preble: 64, 65---	Moderate: percs slowly, dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: percs slowly, dusty.
Prida: 66, 67----	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
Pumper: 68-------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.

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TABLE 7

INTERPRETATIONS OF SOIL PROPERTIES FOR RECREATION

Sonoma Planning Unit Nevada Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Rad: 69----------	Severe: soil blowing.	Severe: soil blowing.	Severe: soil blowing.	4 to 6 percent: Severe - soil blowing. 6 to 8 percent: Severe - soil blowing, slope.
70, 71----------	Moderate: soil blowing.	Moderate: soil blowing.	Moderate: soil blowing.	0 to 2 percent: Moderate - soil blowing 2 to 4 percent: Moderate: slope, soil blowing.
Raglan: 72, 73---	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.
Rebel: 74, 75----	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 4 percent: Moderate - dusty, slope.
Rose Creek: 76---	Severe: floods, wet.	Severe: floods, wet.	Severe: floods, wet.	Severe: floods, wet.
Sagouspe: 77-----	Moderate: too sandy, soil blowing.	Moderate: too sandy, soil blowing.	Moderate: too sandy, soil blowing.	Moderate: too sandy, soil blowing.
Shabliss: 78, 79-	2 to 8 percent: Moderate - dusty. 8 to 15 percent: Moderate - dusty, slope. 15 to 30 percent: Severe - slope.	2 to 15 percent: Moderate - dusty. 15 to 25 percent: Moderate - slope, dusty. 25 to 30 percent: Severe - slope.	2 to 8 percent: Moderate - dusty. 8 to 15 percent: Moderate - dusty, slope. 15 to 30 percent: Severe - slope.	2 to 6 percent: Moderate - dusty, slope. 6 to 30 percent: Severe - slope.

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TABLE 7
INTERPRETATIONS OF SOIL PROPERTIES FOR RECREATION

Sonoma Planning Unit Nevada Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Sonocan: 80------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, stones.
Shepan part of 80----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sonoma: 81, 82---	Severe: floods, wet.	Severe: floods, wet.	Severe: floods, wet.	Severe: floods, wet.
Spinlin: 83, 84---	4 to 8 percent: Moderate - stones. 8 to 15 percent: Moderate - stones, slope. 15 to 30 percent: Severe - slope.	4 to 15 percent: Moderate - stones. 15 to 25 percent: Moderate,- stones, slope. 25 to 30 percent: Severe - slope.	2 to 8 percent: Moderate - stones. 8 to 15 percent: Moderate - stones, slope. 15 to 30 percent: Severe - slope.	2 to 6 percent: Severe - stones. 6 to 30 percent: Severe - stones, slope.
Panin part of 83, 84----------	4 to 8 percent: Slight. 8 to 15 percent: Moderate - slope. 15 to 30 percent: Severe - slope.	4 to 15 percent: Slight. 15 to 25 percent: Moderate - slope. 25 to 30 percent: Severe - slope.	4 to 8 percent: Slight. 8 to 15 percent: Moderate: slope. 15 to 30 percent: Severe - slope.	4 to 6 percent: Moderate - slope, stones. 6 to 30 percent: Severe - slope.
Sumine: 85--------	Severe - slope, stones.	Severe - stones, slope.	Severe - slope, stones.	Severe: slope, stones.
Pernty part of 85----------	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.	Severe: slope, stones.
Trunk: 86--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pocan part of 86----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

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TABLE 7
INTERPRETATIONS OF SOIL PROPERTIES FOR RECREATION

Sonoma Planning Unit Nevada

Date March 1974

Soil series and map symbol	Degree and kind of limitation for ------			
	Camp areas	Paths and trails	Picnic areas	Playgrounds
Valmy: 87, 88----	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 6 percent: Moderate - dusty, slopes. 6 to 8 percent: Severe - slope.
Weso: 90---------	Moderate: too sandy, soil blowing.	Moderate: too sandy, soil blowing.	Moderate: too sandy, soil blowing.	4 to 6 percent: Moderate - too sandy, soil blowing, slope. 6 to 8 percent: Severe - slope, soil blowing.
91, 92----------	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	0 to 2 percent: Moderate - dusty. 2 to 4 percent: Moderate - dusty, slope.

Soil Erosion

Erosion condition classes, soil erodibility factor (K), soil loss tolerance (T), wind erosion group and erosion hazard are used to rate soils for soil erosion.

Erosion condition classes, used by the Bureau of Land Management, are based on the soil surface factors (SSF). It is a numerical factor used to reflect the present erosion condition of the ground surface. It is an expression of current erosion activity. Seven surface features (soil movement, surface litter, erosion pavement, pedestalling, rills, flow patterns, and gullies) are examined in the field and each assigned a numerical value on the basis of the degree to which it occurs. The sum of these numerical values is used to determine the SSF. The SSF is used to group soils into five erosion condition classes as follows: 0 to 20, stable; 21 to 40, slight; 41 to 60, moderate; 61 to 80, critical; and 81 to 100, severe (7).

The soil erodibility factor (K) is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff. It is based on soil properties only, without consideration for rainfall intensity, distribution, amount, length and steepness of slope, or vegetative cover. Soil properties that affect soil erodibility are: (1) soil texture, especially percent of silt plus very fine sand; (2) percent of sand greater than 0.10 millimeters in size; (3) organic matter content; (4) soil structure; (5) permeability; (6) the amount and kind of clay; and gravel,

cobbles, or stones in the soil. Soils with high silt or very fine sand content have high "K" factors. Soils with a high percent of coarse sand have low "K" factors. Soils with high organic matter content have low "K" factors. Soils with stable structure have low "K" factors while soils with weak or no structure (massive or single grain) have higher "K" values. Slow permeability increases the "K" factor while rapid permeability decreases it. Soils high in clay content have relatively low "K" values. Gravel and rock fragments protect the soil against erosion and therefore decrease "K" values.

Twelve "K" value classes are used as follows: .10, .15, .17, .20, .24, .28, .32, .37, .43, .49, .55, and .64. The low "K" values indicate low soil erodibility and high values indicate high erodibility.

Soil Loss Tolerance (T), sometimes called permissible soil loss, is the maximum rate of soil erosion that will permit a high level of crop productivity to be sustained economically and indefinitely.

Soil loss tolerance values (T) of one through five are used. The numbers represent the permissible tons of soil loss per acre per year where food, feed and fiber crops are to be grown. "T" values are not applicable to construction sites or to other non-farm uses of the erosion equation.

The following criteria are used for assigning "T" values to soils:

1. An adequate rooting depth must be maintained in the soil for plant growth. For soils that are shallow

over hard bedrock or other restrictive layers, it is important to retain the remaining soil; therefore, not much soil loss can be tolerated and low "T" values are assigned. The loss tolerance is less and "T" values are assigned for soils shallow to impervious layers than for deep soils or for soils with favorable underlying soil materials that can be renewed.

2. Soils that have significant yield reductions when the surface layer (topsoil) is removed by erosion are given lower "T" values than those where erosion affects yield very little.

For the following reasons a maximum of five tons of soil loss per acre per year has been selected for determining "T" factor values:

1. Soil losses in excess of five tons per acre per year affect the maintenance, cost and effectiveness of water-control structures affected by sediment.
2. Excessive sheet erosion is accompanied by gully formation in many places causing added problems to tillage operations and to sedimentation of ditches, streams and waterways.
3. Loss of plant nutrients. The average value of plant nutrients in a ton of soil is several dollars. The value losses involved with more than five tons of soil loss is considered to be excessive.

4. Numerous practices are known that can be used sucessfully to keep soil losses below five tons per acre per year.

Wind Erodibility Group (WEG) is a rating of soils according to their susceptibility to wind erosion. Soil particles 0.84 millimeters or smaller in diameter (U. S. Standard Sieve No. 20) are susceptible to detachment and transport by wind. Particles larger than 0.84 millimeters are resistant to wind erosion. Wind erodibility groups are expressed as eight classes designated by the numerals 1 through 8. Group 1 is the most highly susceptible to wind erosion and group 8, the least susceptible. The groups are determined on the basis of the percent of soil particles 0.84 millimeters or larger in diameter when the soil is dry. Single grain soils, such as sand, with a high percent of fine particles are most susceptible to wind erosion. Dune sand is a good example. Soils that tend to aggregate (form a stable clod structure) when dry are least susceptible. Also gravel and rock fragments in the soil reduce its susceptibility to wind erosion.

"WEG", "K", and "T" values are used in equations to approximate soil loss from land under varying conditions of rainfall, slope, plant cover and treatment practices.

Erosion hazard is the relative susceptibility of soil to erode when denuded of plant cover. Erosion hazard rating of slight, moderate or high are assigned to reflect susceptibility to accelerated erosion when high energy storm events occur.

Table 8 lists the Erosion Condition Class, Soil Erodibility Factor (K), Soil Loss Tolerance Factor (T), Wind Erosion Group (WEG), and Erosion Hazard for the soils in Sonoma Planning Unit.

Table 8.--Soil Erosion
Sonoma Planning Unit
Nevada

Soil series and map symbol	Soil erodibility factor 1/ (K)	Soil loss tolerance 2/ (T)	Wind erosion group 3/ (WEG)	Erosion hazard	Erosion condition class 4/
Adelaide: 12, 13,					
14----------	.49	2	6	Slight to moderate	Slight
15----------	.37	2	7	Moderate	Slight to moderate
Benin: 16--------	.17	2	2	Slight	Stable
17, 19----------	.49	2	6	Slight	Stable
18----------	.49	2	6	High	Moderate
Blackhawk: 20----	.55	1	5	Moderate	Slight
Bliss: 21--------	.32	2	3	Slight to Moderate	Slight
22----------	.32	2	3	High	Severe to moderate
Chiara part of 22----------	.32	1	3	High	Moderate
Chiara: 23-------	.37	1	5	Slight	Slight
Dryn: 24---------	.20	3	7	High	Moderate
Winada part of 24----------	.20	2	7	High	Moderate to critical
Duffer: 25, 26---	.43	5	7	Slight	Stable
Dun Glen: 27, 29-	.43	5	5	Slight	Stable to slight
28----------	.43	5	5	Moderate	Slight
Golconda: 30-----	.49	3	6	Moderate	Slight
31----------	.49	3	6	High	Slight to moderate

Table 8.--Soil Erosion
Sonoma Planning Unit
Nevada

Soil series and map symbol	Soil erodibility factor 1/ (K)	Soil loss tolerance 2/ (T)	Wind erosion group 3/ (WEG)	Erosion hazard	Erosion condition class 4/
Goldrun: 32, 33, 34, 35, 36, 37---	.20	5	1	High	Slight
Benin part of 35, 36----------	.49	2	6	Slight	Stable
Preble part of 37----------	.32	5	3	Slight	Stable to slight
Golsum: 38--------	.32	2	7	High	Moderate
Graley part of 38----------	.32	1	7	High	Moderate
Graley: 39--------	.32	1	7	High	Moderate
Percoun part of 39----------	.37	2	7	High	Moderate
Granyon: 40------	.24	2	7	High	Moderate
Shoken part of 40----------	.17	1	5	High	Moderate
Harcany: 41------	.43	5	7	High	Moderate
Winevada part of 41----------	.43	2	6	High	Moderate to critical
Humboldt: 42, 43, 44, 45-------	.37	5	7	Slight	Stable
McConnel: 46-----	.37	2	3	Slight	Stable to slight
47----------	.32	2	4	Moderate	Slight
48----------	.32	2	4	High	Moderate

Table 8.--Soil Erosion
Sonoma Planning Unit
Nevada

Soil series and map symbol	Soil erodibility factor 1/ (K)	Soil loss tolerance 2/ (T)	Wind erosion group 3/ (WEG)	Erosion hazard	Erosion condition class 4/
Mullyon: 49------	.49	1	5	High	Moderate to critical
Rock outcrop part of 49-------	NA	NA	NA	NA	NA
Needle Peak: 50, 51----------	.55	5	6	Slight	Stable to slight
Nevtah: 52-------	.43	2	7	Moderate to high	Slight to moderate
Ninch: 53--------	.24	5	1	High	Slight
Nomara: 54-------	.49	2	7	High	Moderate to critical
Gosumi part of 54----------	.43	3	7	High	Moderate
Ocala: 55--------	.37	2	7	Slight	Stable
Orovada: 56------	.43	5	5	Slight	Stable to slight
58, 59----------	.37	5	5	Slight to moderate	Stable to slight
Percoun: 60------	.37	2	7	High	Moderate
Rock outcrop part of 60-------	NA	NA	NA	NA	NA
Pernty: 61, 62---	.43	1	7	High	Moderate
Iver part of 61, 62----------	.55	5	7	High	Moderate
Pocker: 63-------	.43	5	7	Slight	Stable to slight
Preble: 64, 65---	.55	5	5	Slight	Stable to slight

Table 8.--Soil Erosion
Sonoma Planning Unit
Nevada

Soil series and map symbol	Soil erodibility factor 1/ (K)	Soil loss tolerance 2/ (T)	Wind erosion group 3/ (WEG)	Erosion hazard	Erosion condition class 4/
Prida: 66, 67----	.43	5	6	Slight	Stable to slight
Pumper: 68-------	.55	5	5	Slight to moderate	Slight
Rad: 69----------	.24	5	2	Moderate to high	Slight to moderate
70, 71----------	.37	5	3	Slight to moderate	Stable to slight
Raglan: 72, 73---	.55	5	6	Slight	Stable to slight
Rebel: 74, 75----	.43	5	6	Slight to moderate	Stable to slight
Rose Creek: 76---	.32	5	5	Slight	Stable
Sagouspe: 77-----	.24	5	2	High	Slight
Shabliss: 78-----	.49	2	5	Moderate	Slight
79----------	.49	2	5	High	Slight to moderate
Sonocan: 80------	.43	3	7	High	Moderate
Shepan part of 80----------	.28	5	7	High	Moderate
Sonoma: 81, 82---	.43	5	6	Slight	Stable
Spinlin: 83------	.49	2	7	Moderate	Slight to moderate
Panin part of 83----------	.49	2	7	Moderate to high	Slight to moderate
84----------	.49	2	7	High	Moderate
Panin part of 84----------	.49	2	7	Moderate to high	Slight to moderate
Sumine: 85-------	.37	2	7	High	Moderate to critical
Pernty part of 85----------	.37	1	7	High	Moderate to critical

Table 8.--Soil Erosion
Sonoma Planning Unit
Nevada

Soil series and map symbol	Soil erodibility factor 1/ (K)	Soil loss tolerance 2/ (T)	Wind erosion group 3/ (WEG)	Erosion hazard	Erosion condition class 4/
Trunk: 86--------	.43	2	6	High	Moderate
Pernty part of 86----------	.43	3	6	High	Moderate
Valmy: 87, 88, 89----------	.37	5	3	Slight to moderate	Stable to slight
Weso: 90---------	.24	5	2	Moderate	Slight to moderate
91, 92----------	.49	5	5	Moderate	Slight

FOOTNOTES:

NA - Not applicable.

1/ - Applied in this table to surface soil only. Erodibility factor in soil loss equation.

2/ - Soil loss tolerance as applied in soil loss equation.

3/ - Wind erosion group as applied in wind erosion equation. Applied to surface soil only.

4/ - Relative susceptibility of soil without protective benefit of plant cover to erode.

5/ - Present status of erosion under existing plant cover at date of soil survey.

The hydrologic classification of the soils in the Sonoma Planning Unit is as follows:

Group A	Group B	Group C	Group D
Goldrun	Granyon	Dryn	Adelaide
	Harcany	Dun Glen	Benin
	Iver	Gosumi	Blackhawk
	McConnel	Needle Peak	Bliss
	Nomara	Nevtah	Chiara
	Rebel	Ninch	Duffer
	Valmy	Orovada	Golconda
		Panin	Golsum
		Pocan	Graley
		Preble	Humboldt
		Pumper	Mullyon
		Rad	Percoun
		Raglan	Pernty
		Rose Creek	Pocker
		Sagouspe	Prida
		Sumine	Shabliss
		Weso	Shepan
		Winada	Shoken
		Winevada	Sonocan
			Sonoma
			Spinlin
			Trunk

Group C.--Soils having slow infiltration rates when thoroughly wetted, consisting mainly of (1) soils with a layer that impedes the downward movement of water, or (2) soils with moderately fine to fine texture and slow infiltration rate. These soils have a slow rate of water transmission.

Group D.--Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of (1) clayey soils with a high swelling potential, (2) soils with a high permanent water table, or (3) soils with a claypan or clay layer at or over nearly impervious materials. These soils have a very slow rate of water transmission.

Hydrologic Soil Groups

Certain soil properties exert an influence on the amount of runoff from rainfall a watershed will generate. Whenever an estimate of the potential for runoff from an area is needed, as in flood control work, these properties must be considered.

The infiltration rate is the rate at which water enters the soil at the surface. The transmission rate is the rate at which water moves in or through the soil profile. These parameters, which are controlled by properties of the soil, influence the potential for runoff. Soils with high infiltration rates and high transmission rates will absorb large quantities of water and therefore have low potential for runoff. The converse is also true.

The soils in the Sonoma Planning Unit are classified into four groups, known as hydrologic soil groups, on the basis of properties which influence the runoff potential. The definitions of the hydrologic soil groups are as follows:

Group A.--Soils having high infiltration rates even when thoroughly wetted, consisting mainly of deep, well to excessively drained sands and/or gravel. These soils have a high rate of water transmission and would result in a low runoff potential.

Group B.--Soils having moderate infiltration rates when thoroughly wetted, consisting mainly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Effective Root Depth

Effective root depth (ERD) is the depth of soil material most favorable for root penetration and growth from the soil surface to a limiting layer. Limitations to root penetration and growth include cemented hardpans, bedrock, clay layers or limitations due to a moisture deficiency (7).

Most soils in the Area have limited moisture supplied by natural precipitation. This, in turn, is a major limiting factor to root penetration by native plants. Other soils have supplemental moisture supplied by an underground water table or spring runoff from adjacent areas. These soils have deeper effective root depths than do the dry soils.

Table 9 lists the soils and the effective root depth (ERD) for each soil in the Sonoma Planning Unit.

Table 9.--Effective Root Depth
Sonoma Planning Unit
Nevada

Soil series	ERD (inches)	Soil series	ERD (inches)
Adelaide--------	10 to 15	Nomara----------	15 to 20
Benin----------	20 to 25	Orovada---------	20 to 25
Blackhawk-------	12 to 18	Panin----------	15 to 20
Bliss----------	15 to 20	Percoun---------	10 to 15
Chiara----------	15 to 20	Pernty----------	10 to 15
Dryn----------	15 to 20	Pocan----------	20 to 25
Duffer----------	30 to 60	Pocker----------	20 to 25
Dun Glen--------	20 to 25	Preble----------	20 to 25
Golconda--------	20 to 25	Prida----------	20 to 25
Goldrun---------	24 to 36	Pumper----------	15 to 20
Goldsum---------	15 to 20	Rad----------	20 to 25
Gosumi----------	20 to 25	Raglan----------	20 to 25
Graley----------	10 to 15	Rebel----------	20 to 25
Granyon---------	20 to 25	Rose Creek------	30 to 60
Harcany---------	20 to 25	Sagouspe--------	30 to 60
Humboldt--------	30 to 60	Shabliss--------	12 to 18
Iver----------	20 to 25	Shepan----------	20 to 25
McConnel--------	20 to 25	Shoken----------	5 to 10
Mullyon---------	10 to 15	Sonocan---------	20 to 25
Needle Peak-----	20 to 25	Sonoma----------	30 to 60
Nevtah----------	20 to 25	Spinlin---------	14 to 18
Ninch----------	24 to 36	Sumine----------	15 to 20
Trunk----------	10 to 15	Valmy----------	20 to 25
Weso----------	20 to 25	Winada----------	15 to 21
		Winevada--------	20 to 25

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Glossary

Alkalinity.--The state of being alkaline.

Alkali soil.--(1) A soil that contains sufficient sodium (alkali) to interfere with the growth of most crop plants. (2) A soil with a high degree of alkalinity (pH of 8.5 or greater) or with a high exchangeable sodium content (15% or more of the exchnage capacity), or both.

Alkaline soil.--Any soil that has a pH greater than 7.3.

Alluvium.--Soil material transported and deposited by water.

Amendment, soil.--Any substance added to the soil to alter the properties of the soil for the purpose of making the soil more suitable for the production of plants. A common amendment is gypsum applied to alkali soils.

Available water.--The portion of water in the soil that can be readily absorbed by plant roots.

Available water capacity.--The capacity of the soil to store available water. Normally expressed as inches of water.

Buried soil.--A soil covered by a deposit of additional soil material, usually to a depth greater than the thickness of the solum.

Calcareous soil.--Soil containing sufficient calcium carbonate to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Cemented.--Particles held together by a cementing substance.

Chroma.--The relative purity, strength or saturation of a color; directly related to the dominance of the determing wave length of the light and inversely related to grayness; one of the three variables of color.

Clay.--The mineral soil particles smaller than 0.002 millimeters in diameter.

Clayey.--Containing large amounts of clay or having properties similar to those of clay.

Coarse fragments.--Rock or mineral particles larger than 2 millimeters in diameter.

Cobbles.--Rock or mineral fragments between 3 inches and 10 inches in diameter.

Cobbly.--Containing appreciable amounts of cobbles.

Concretion.--A concentration of a substance, such as calcium carbonate or iron oxide, in the form of a grain or nodule of varying size, shape, hardness, and color.

Consistence, soil.--The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are--

Loose.--Noncoherent when dry or moist; does not hold together in a mass.

Friable.--When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.--When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.--When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.--When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.--When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.--When dry, breaks into powder or individual grains under very slight pressure.

Cemented.--Hard; little affected by moistening.

Crust.--A surface layer that is much more compact or hard, when dry, then the material immediately beneath it.

Cultivation.--Tillage or manipulation of the soil associated with crop production.

Depth, effective soil.--The depth of soil material to which plant roots can penetrate readily to obtain water and nutrients. It is the depth to a layer that has physical

or chemical properties which seriously retard or prevent the penetration of water and roots.

Disperse.--To break up compound particles, such as soil aggregates, into finer component particles.

Drainage class (natural).--Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.--Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.--Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.--Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.--Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but peridoically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.--Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.--Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.--Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Erosion.--The weathering away of the land surface, detachment, and movement of soil or rock particles by water, wind, ice, or other geologic agents.

Flood plain.--The land bordering a stream, built up of sediments from overflow of the stream, and subject to inundation when the stream is at flood stage.

Gravel.--Rock or mineral fragments between 2 millimeters and 3 inches in diameter.

Gravelly.--Containing appreciable or significant amounts of gravel.

Hardpan.--A hardened soil layer caused by cementing together of soil particles by a cementing substance.

Horizon, soil.--A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes and that differs in one or more ways from adjacent horizons.

Humus.--That usually dark colored, more or less stable fraction of the soil organic matter that remains after the major portion of plant and animal residues have decomposed.

Impervious.--Resistant to pentration by fluids or by plant roots.

Infiltration.--The downward entry of water into the soil.

Infiltration rate.--The rate at which water penetrates the surface of the soil at any given instant, usually express in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Lacustrine deposit.--Material deposited as sediments from lake water.

Landscape.--All the natural features such as fields, hills, forests, water, etc., which distinguish one part of the earth's surface from another. Usually that portion of land or territory which the eye can comprehend in a single view, including all its natural characteristics.

Leaching.--The removal of substances in solution by water percolating through the soil.

Loess.--Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Mineral soil.--A soil consisting dominantly of, and having its properties determined dominantly by, mineral matter. Usually contains less than 20 percent organic matter, but may contain an organic surface layer up to 12 inches thick.

Mottles.--Spots or blotches of different color or shades of color interspersed with the dominant color of the soil.

Munsell notation.--A designation of color by degrees of the three single variables--hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral.--Neither acid nor alkaline in reaction. pH is 7.0.

Neutral soil.--A soil having a pH value between 6.6 and 7.3.

Organic matter.--A general term for plant and animal material, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition.

Organic soil.--A soil which contains a high percentage (15 to 20 percent or more) of organic matter throughout the profile.

Parent material.--The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of soils is developed.

Percolation, soil water.--The downward movement of water through soil.

Permeability.--The characteristic of a soil which permits water or air to move through it. Express as inches per hour with permeability classes as follows; (1) very slow, less than 0.06 inches per hour; (2) slow, 0.06 to 0.2 inches per hour; (3) moderately slow, 0.2 to 0.6 inches per hour; (4) moderate, 0.6 to 2.0 inches per hour; (5) moderately rapid, 2.0 to 6.0 inches per hour; (6) rapid, 6.0 to 20.0 inches per hour; and (7) very rapid, over 20.0 inches per hour.

pH.-- (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Phase, soil.--A subdivision of a soil series or other unit of classification having characteristics that affect the use and management of the soil but which do not vary sufficiently to differentiate it as a separate series, etc.

Profile, soil.--A vertical section of the soil through all its horizons and extending from the surface into the parent material.

Reaction, soil.--The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as--

	pH		pH
Extremely acid---	Below 4.5	Neutral---------	6.6 to 7.3
Very strongly acid-	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid------	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid--------	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid------	6.1 to 6.5	Very strongly alkaline--	9.1 and higher

Runoff.--The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline-alkali soil.--A soil that contains a harmful concentration of salts and exchangeable sodium; contains harmful salts and is strongly alkaline; or contains harmful salts and exchangeable sodium and is very strongly alkaline. The salts, exchangeable sodium, and alkaline reaction are in the soil in such location that growth of most crop plants is less than normal.

Saline soil.--A soil containing sufficient quantities of soluble salts to interfere with or reduce the growth of most crop plants.

Salt-affected soil.--Soil that has been adversely modified for the growth of most crop plants by the presence of certain types of soluble salts.

Sand.--As a soil separate, individual rock or mineral fragments from, 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Silt.--As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Soil piping.--A form of erosion in which water flowing through the soil carries fine particles with it, resulting in formation of tiny tunnels through the soil.

Soil pores.--Interstices or voids or that part of the bulk volume of soil not occupied by soil particles.

Soil salinity.--The amount of soluble salts in a soil, expressed in terms of percentages parts per million, or other convenient ratios.

Soil separates.--Mineral particles less than 2 millimeters in diameter and ranging between specified size limits. The names and size limits of specified separates are; (1) very coarse sand 1.0 to 2.0 millimeters; (2) coarse sand, 0.5 to 1.0 millimeters; (3) medium sand, 0.25 to 0.5 millimeter; (4) fine sand, 0.1 to .25 millimeter; (5) very fine sand, 0.05 to 0.1 millimeters; (6) silt, 0.002 to 0.05 millimeters; and (7) clay, smaller than 0.002 millimeters.

Soil solution.--The soil water or the aqueous liquid phase of the soil and its solutes.

Solum.--The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones.--Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony.--Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil.--The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are--platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil.--Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling.--Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum.--The part of the soil below the solum.

Terrace (geologic).--An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is freqeuntly called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil.--The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam, classes may be further divided by specifying "coarse", "fine," or "very fine."

Topsoil (engineering).--Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Volcanic ash.--Fine, silt-like particles which are blown into the air from erupting volcanoes and which later settle to the earth.

Water table.--The upper surface of ground water or that level below which the soil is saturated with water; locus of points in soil water at which the hydraulic pressure is equal to atmospheric pressure.

Soil Mapping Unit		Land Capability Unit				Range Site		Wildlife Suitability Group			
		Irrigated		Dryland				Irrigated		Dryland	
Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
11 Adelaide silt loam, 2 to 8 percent slopes.	22	IVe-21	219	VIIs-231	250	NV 24-20, Droughty loam, 8 to 10 inch P. Z.	278	3-4-I	290	--43	290
12 Adelaide silt loam, low rainfall, 0 to 2 percent slopes.	22	IVs-40	224	VIIs-231	250	NV 24-2, Desert loamy	262	3-4-I	290	--43	290
13 Adelaide silt loam, low rainfall, 2 to 8 percent slopes.	23	IVe-21	219	VIIs-231	250	NV 24-2, Desert loamy	262	3-4-I	290	--43	290
14 Adelaide silt loam, slightly saline-alkali, 0 to 2 percent slopes.	24	IVs-40	224	VIIs-231	250	NV 24-20, Droughty loam, 8 to 10 inch P. Z.	278	3-4-I	290	--43	290
15 Adelaide stony silt loam, 4 to 15 percent slopes	25	----------	-----	VIIs-237	252	NV 24-20, Droughty loam, 8 to 10 inch P. Z.	278	----------	-----	--43	290
16 Benin loamy fine sand, 0 to 2 percent slopes.	28	IVs-48	227	VIIs-229	249	NV 24-2, Desert loamy	262	2-4-I	290	--43	290
17 Benin silt loam, 0 to 2 percent slopes.	29	IVs-41	225	VIIs-226	248	NV 24-2, Desert loamy	262	2-4-I	290	--43	290
18 Benin silt loam, 15 to 30 percent slopes.	29	----------	-----	VIIe-224	247	NV 24-3, Desert sodic terrace	263	---------	-----	--44	290
19 Benin silt loam, saline-alkali, 0 to 2 percent slopes.	30	----------	-----	VIIs-221	246	NV 24-3, Desert sodic terrace	263	---------	-----	--44	290
20 Blackhawk silt loam, 0 to 4 percent slopes.	33	IVe-21	219	VIIs-231	250	NV 24-2, Desert loamy	262	3-4-I	290	--44	290
21 Bliss fine sandy loam, 2 to 8 percent slopes.	37	IIIe-21	214	VIc-220	237	NV 24-20, Droughty loam, 8 to 10 inch P. Z.	278	2-4-I	290	--43	290
22 Bliss-Chiara association	38	----------	-----	----------	-----	----------	-----	---------	-----	---------	-----
Bliss part		----------	-----	VIc-220	237	NV 24-20, Droughty loam, 8 to 10 inch P. Z.	278	---------	-----	--43	290
Chiara part		----------	-----	VIIe-221	239	NV 24-5, Loamy, 8 to 10 inch P.Z.	264	3-4-I	290	--43	290
23 Chiara stony very fine sandy loam, 2 to 4 percent slopes.	42	IVs-53	228	VIIs-231	250	NV 24-5, Loamy, 8 to 10 inch P. Z.	264	3-4-I	290	--43	290

Soil Mapping Unit		Land Capability Unit				Range Site		Wildlife Suitability Group			
		Irrigated		Dryland				Irrigated		Dryland	
Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
24 Dryn-Winada association	45	----------	-----	----------	-----	----------	----	----------	----	---------	-----
Dryn part		----------	-----	VIIs-214	244	NV 24-21, Upland loamy, 12 to 16 inch P. Z.	279	----------	----	--42	290
Winada part		----------	-----	VIIs-218	245	NV 24-16, Upland ridges	274	----------	----	--42	290
Rock outcrop part		----------	-----	VIIIs	258	----------	-----	----------	----	---------	-----
25 Duffer silty clay loam, slightly saline-alkali	49	IVw-64	222	VIw-221	230	NV 24-9, Saline meadow	269	2-2-I	290	--24	290
26 Duffer silty clay loam, strongly saline-alkali	50	---------	-----	VIIw-221	246	NV 24-10, Sodic flood plain	270	----------	----	--34	290
27 Dun Glen loam, 0 to 2 percent slopes	53	IIc-1	212	VIIc-240	257	NV 24-2, Desert loamy	262	1-4-I	290	--42	290
28 Dun Glen loam, 2 to 4 percent slopes	53	IIe-20	207	VIIc-240	257	NV 24-2, Desert loamy	262	1-4-I	290	--42	290
29 Dun Glen loam, gravel substratum, 0 to 2 percent slopes	54	IIs-45	210	VIIc-240	257	NV 24-2, Desert loamy	262	1-4-I	290	--42	290
30 Golconda silt loam, 2 to 8 percent slopes	57	----------	-----	VIIc-240	257	NV 24-2, Desert loamy	262	---------	-----	--43	290
31 Golconda silt loam, 8 to 15 percent slopes	58	----------	----	VIIc-240	257	NV 24-2, Desert loamy	262	---------	-----	--43	290
32 Goldrun fine sand, 4 to 15 percent slopes	61	IVs-43	226	VIIs-224	247	NV 24-1, Sand hills	261	3-4-I	290	--43	290
33 Goldrun loamy fine sand, 0 to 2 percent slopes	62	IVs-43	226	VIIs-224	247	NV 24-1, Sand hills	261	3-4-I	290	--43	290
34 Goldrun loamy fine sand, undulating	62	IVs-43	226	VIIs-224	247	NV 24-1, Sand hills	261	3-4-I	290	--43	290
35 Goldrun-Benin complex, undulating	63	IVs-43	226	VIIs-224	247	----------	-----	---------	-----	---------	-----
Goldrun part		----------	-----	----------	-----	NV 24-1, Sand hills	261	3-4-I	290	--43	290
Benin part		----------	-----	----------	-----	NV 24-2, Desert loamy	262	3-4-I	290	--43	290
36 Goldrun-Benin complex, rolling	64	IVs-43	226	VIIs-224	247	----------	-----	---------	-----	---------	-----
Goldrun part		----------	-----	----------	-----	NV 24-1, Sand hills	261	3-4-I	290	--43	290
Benin part		----------	-----	----------	-----	NV 24-2, Desert loamy	262	2-4-I	290	--43	290

Soil Mapping Unit		Land Capability Unit				Range Site		Wildlife Suitability Group			
		Irrigated		Dryland				Irrigated		Dryland	
Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
37 Goldrun-Preble complex	65	IVs-43	226	VIIs-224	247	----------	-----	----------	----	---------	-----
Goldrun part		----------	-----	----------	-----	NV 24-1, Sand hills	261	3-4-I	290	--43	290
Preble part		----------	-----	----------	-----	NV 24-17, Semidesert sandy	275	2-4-I	290	--34	290
38 Golsum-Graley association	69	----------	-----	----------	-----	----------	-----	---------	-----	---------	-----
Golsum part		---------	-----	-VIIs-239	254	NV 24-13, Loamy, 10 to 12 inch P. Z.	273	---------	-----	--43	291
Graley part		---------	-----	VIIs-237	252	NV 24-13, loamy, 10 to 12 inch P. Z.	273	---------	-----	--44	291
39 Graley-Percoun association	75	---------	----	----------	-----	----------	-----	---------	-----	---------	-----
Graley part		---------	----	VIIs-237	252	NV 24-13, Loamy 10 to 12 inch P. Z.	273	---------	-----	--44	291
Percoun part		---------	----	VIIs-214	244	NV 24-21, Upland loamy, 12 to 16 inch P. Z.	279	---------	-----	--42	291
40 Granyon-Shoken association	79	---------	----	----------	-----	----------	-----	---------	-----	---------	-----
Granyon part		---------	----	VIIs-243	255	NV 24-13, Loamy 10 to 12 inch P.Z.	273	---------	-----	--43	291
Shoken part		---------	----	VIIs-238	253	NV 24-5, Loamy, 8 to 10 inch P. Z.	264	---------	-----	--43	291
41 Harcany-Winevada association	83	---------	----	----------	----	----------	-----	---------	-----	---------	-----
Harcany part		---------	----	VIIs-211	243	NV 24-21, Upland loamy, 12 to 16 inch P. Z.	279	---------	-----	--42	291
Winevada part		---------	----	VIIs-211	243	NV 24-21, Upland loamy, 12 to 16 inch P. Z.	279	---------	-----	--42	291
42 Humboldt silty clay loam, sandy substratum	86	IIIw-60	215	VIw-220	229	NV 24-8, Moist flood plain	268	2-2-I	291	--22	291
43 Humboldt silty clay loam, slightly saline	87	IVw-61	221	VIw-221	230	NV 24-8, Moist flood plain	268	2-2-I	291	--23	291
44 Humboldt silty clay loam, strongly saline	88	IVw-61	221	VIIw-221	230	NV 24-7, Saline bottom	267	2-2-I	291	--23	291

Soil Mapping Unit		Land Capability Unit				Range Site		Wildlife Suitability Group			
		Irrigated		Dryland				Irrigated		Dryland	
Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
45 Humboldt silty clay, slightly saline	88	IVw-68	223	VIw-228	232	NV 24-8, Moist flood plain	268	2-2-I	291	--23	291
46 McConnel fine sandy loam, 0 to 2 percent slopes	94	IIIs-45	218	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch P. Z.	278	2-4-I	291	--42	291
47 McConnel gravelly fine sandy loam, 4 to 8 percent slopes	95	IVe-25	220	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch P. Z.	278	2-4-I	291	--42	291
48 McConnel cobbly sandy loam, 15 to 30 percent slopes	95	---------	-----	VIs-236	236	NV 24-20, Droughty loam 8 to 10 inch P. Z.	278	2-4-I	291	--42	291
49 Mullyon-Rock outcrop complex	97	---------	-----	VIIs-237	252	----------	-----	---------	-----	--------	-----
Mullyon part		---------	-----	----------	-----	NV 24-19, Semidesert sandy	277	---------	-----	--44	291
Rock outcrop part		---------	-----	----------	-----	----------	-----	---------	-----	--------	-----
50 Needle Peak silt loam, slightly saline-alkali	102	IIs-46	211	VIs-221	235	NV 24-6, Dry flood plain	266	1-3-I	291	--33	291
51 Needle Peak silt loam, strongly saline-alkali	102	IIIw-61	216	VIIs-221	246	NV 24-7, Saline bottom	267	2-3-I	291	--34	291
52 Nevtah stony silt loam, 15 to 30 percent	105	---------	-----	VIs-211	233	NV 24-7, High mountain loam	283	---------	-----	--42	291
53 Ninch fine sand, 0 to 15 percent slopes	108	IVs-43	226	VIIs-224	247	NV 24-17, Semidesert sandy	275	3-4-I	291	--42	291
54 Nomara-Gosumi association	111	---------	-----	----------	-----	----------	-----	---------	-----	---------	-----
Nomara part		---------	-----	VIIs-239	254	NV 24-23, Upland north slopes	281	---------	-----	--41	292
Gosumi part		---------	-----	VIIs-239	254	NV 24-18, Semidesert claypan	276	---------	-----	--43	292
56 Orovada loam, 0 to 2 percent slopes	114	IIc-1	212	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch P. Z.	278	1-3-I	292	--42	292

Soil Mapping Unit			Land Capability Unit				Range Site		Wildlife Suitability Group			
			Irrigated		Dryland				Irrigated		Dryland	
	Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
58	Orovada gravelly loam, 0 to 2 percent slopes	114	IIc-1	212	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch P. Z.	278	1-3-I	292	--42	292
59	Orovada gravelly loam, 2 to 4 percent slopes	115	IIe-20	207	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch, P. Z.	278	1-3-I	292	--42	292
60	Percoun-Rock outcrop association	120	---------	-----	---------	-----	----------	-----	---------	-----	---------	-----
	Percoun part		---------	-----	VIs-214	234	NV 24-21, Upland loamy, 12 to 16 inch P. Z.	279	---------	-----	--42	292
	Rock outcrop part		---------	-----	VIIIs	258	----------	-----	---------	-----	--------	-----
61	Pernty-Iver association, steep	123	---------	-----	---------	-----	----------	-----	---------	-----	--------	-----
	Pernty part		---------	-----	VIIs-237	252	NV 24-13, Loamy, 10 to 12 inch P. Z.	273	---------	-----	--43	292
	Iver part		---------	-----	VIIe-220	238	NV 24-23, Upland north slopes	281	---------	-----	--42	292
62	Pernty-Iver association, very steep	124	---------	-----	---------	-----	----------	----	---------	-----	--------	-----
	Pernty part		---------	-----	VIIs-237	252	NV 24-19, Semidesert juniper savannah	277	---------	-----	-43	292
	Iver part		---------	-----	VIIe-220	238	NV 24-23, Upland north slopes	281	---------	-----	--42	292
63	Pocker silty clay loam	129	IVw-64	222	VIIs-227	242	NV 24-11, Sodic flat	272	3-3-I	292	--34	292
64	Preble silt loam, slightly saline-alkali	132	IIIw-64	217	VIw-227	231	NV 24-17, Semidesert sandy	275	2-4-I	292	--34	292
65	Preble silt loam, strongly saline-alkali	132	IVw-61	222	VIIw-221	241	NV 24-11, Sodic flat	272	2-4-I	292	--34	292
66	Prida silt loam, slightly saline-alkali	136	IIIw-64	217	VIw-227	231	NV 24-3, Desert sodic terrace	263	3-3-I	292	--33	292
67	Prida silt loam, strongly saline-alkali	137	---------	-----	VIIw-227	242	NV 24-3, Desert sodic terrace	263	3-2-I	292	--34	292
68	Pumper loam	140	IIIs-45	218	VIIc-240	257	NV 24-2, Desert loamy	262	3-4-I	292	--43	292

Soil Mapping Unit		Land Capability Unit				Range Site		Wildlife Suitability Group			
		Irrigated		Dryland				Irrigated		Dryland	
Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
69 Rad loamy fine sand, 4 to 8 percent slopes	143	----------	-----	VIc-220	237	NV 24-17, Semidesert sandy	275	----------	----	--42	292
70 Rad fine sandy loam, 0 to 2 percent slopes	144	IIc-1	212	VIc-220	237	NV 24-17, Semidesert sandy	275	1-4-I	292	--42	292
71 Rad fine sandy loam, 2 to 4 percent slopes	144	IIe-20	207	VIc-220	237	NV 24-17, Semidesert sandy	275	1-4-I	292	--42	292
72 Raglan silt loam, slightly saline-alkali	147	IIs-46	211	VIs-221	235	NV 24-2, Desert loamy	262	1-4-I	292	--43	292
73 Raglan silt loam, strongly saline-alkali	148	IIIw-61	216	VIIs-221	246	NV 24-3, Desert sodic terrace	263	2-2-I	292	--34	292
74 Rebel loam, 0 to 2 percent slopes	150	IIc-1	212	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch, P. Z.	278	1-4-I	292	--42	292
75 Rebel loam, 2 to 4 percent slopes	151	IIe-20	207	VIc-220	237	NV 24-20, Droughty loam 8 to 10 inch P. Z.	278	1-4-I	292	--42	292
76 Rose Creek loam	153	IIIw-60	215	VIw-220	229	NV 24-8, Moist flood plain	268	2-2-I	292	--42	292
77 Sagouspe loamy fine sand	157	----------	-----	VIIw-221	241	NV 24-11, Sodic flat	272	---------	-----	--34	292
78 Shabliss very fine sandy loam, 2 to 8 percent slopes	160	IVe-21	219	VIIs-231	250	NV 24-5, Loamy 8 to 10 inch P. Z.	264	3-4-I	293	--42	293
79 Shabliss very fine sandy loam, 8 to 15	161	----------	-----	VIIs-231	250	NV 24-5, Loamy 8 to 10 inch P. Z.	264	3-4-I	293	--42	293
80 Sonocan-Shepan association	168	----------	-----	----------	-----	----------	-----	---------	-----	---------	-----
Sonocan part		----------	-----	VIIs-239	254	NV 24-13, Loamy 10 to 12 inch P. Z.	273	---------	-----	--43	293
Shepan part		----------	-----	VIIs-239	254	NV 24-23, Upland north slope	281	---------	-----	--42	293

Soil Mapping Unit		Land Capability Unit				Range Site		Wildlife Suitability Group			
		Irrigated		Dryland				Irrigated		Dryland	
Symbol and Name	Page	Symbol	Page	Symbol	Page	Symbol and Name	Page	Symbol	Page	Symbol	Page
81 Sonoma silt loam, slightly saline-alkali	171	IIw-61	209	VIw-221	230	NV 24-8, Moist flood plain	268	1-2-I	293	--22	293
82 Sonoma silt loam, strongly saline-alkali	171	IIIw-61	216	VIIw-221	241	NV 24-7, Saline bottom	267	2-2-I	293	--34	293
83 Spinlin-Panin association, sloping	175	---------	-----	---------	-----	----------	-----	---------	-----	--------	-----
Spinlin part		---------	-----	VIIs-214	244	NV 24-16, Upland ridges	274	---------	-----	--43	293
Panin part		---------	-----	VIs-214	234	NV 24-27, High mountain loam	283	---------	-----	--42	293
84 Spinlin-Panin association, moderately steep	176	---------	-----	---------	-----	----------	-----	---------	-----	---------	-----
Spinlin part		---------	-----	VIIs-214	244	NV 24-16, Upland ridges	274	---------	-----	--43	293
Panin part		---------	-----	VIs-214	234	NV 24-17, High mountain loam	283	---------	-----	--42	293
85 Sumine-Pernty association	179	---------	-----	---------	-----	----------	-----	---------	-----	---------	-----
Sumine part		---------	-----	VIIs-236	251	NV 24-19, Semidesert juniper savannah	277	---------	-----	--42	293
Pernty part		---------	-----	VIIs-237	252	NV 24-19, Semidesert juniper savannah	277	---------	-----	--43	293
86 Trunk-Pocan association	182	---------	-----	---------	-----	----------	-----	---------	-----	--------	-----
Trunk part		---------	-----	VIIs-239	254	NV 24-5, Loamy, 8 to 10 inch P. Z.	264	---------	-----	--42	293
Pocan part		---------	-----	VIIs-239	254	NV 24-5, Loamy, 8 to 10 inch P. Z.	264	---------	-----	--42	293
87 Valmy fine sandy loam	185	IIs-45	210	VIc-220	237	NV 24-22, Semidesert benchland	280	1-4-I	293	--42	293
88 Valmy fine sandy loam, saline-alkali	186	IIs-46	211	VIIs-221	246	NV 24-22, Semidesert benchland	280	1-4-I	293	--44	293
89 Valmy fine sandy loam, undulating	187	IIIe-20	213	VIc-220	237	NV 24-22, Semidesert benchland	280	1-4-I	293	--42	293
90 Weso loamy sand, 4 to 8 percent slopes	191	---------	-----	VIIs-265	256	NV 24-2, Desert loamy	262	---------	-----	--43	293
91 Weso very fine sandy loam, 0 to 2 percent slopes	191	IIc-1	212	VIIc-240	257	NV 24-2, Desert loamy	262	1-4-I	293	--43	293
92 Weso very fine sandy loam, gravel substratum, 2 to 4 percent slopes	192	IIe-25	208	VIIc-240	257	NV 24-2, Desert loamy	262	1-4-I	293	--43	293